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Forty-Second Annual Report

OF THE

BOARD OF TRUSTEES

OF

THE CLEMSON AGRICULTURAL COLLEGE

TO THE

General Assembly of South Carolina

1931

97

THE CLEMSON AGRICULTURAL COLLEGE

RECORD

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LETTER OF TRANSMITTAL

To The Members of the General Assembly,
Columbia, South Carolina

Gentlemen:

The Trustees of The Clemson Agricultural College of South Carolina beg to transmit herewith, for your information and thoughtful consideration, the report of President E. W. Sikes, concerning the affairs of the College for the fiscal year July 1, 1930 to June 30, 1931. You will find this report, as usual, full and illuminating.

We realize fully the economic and financial depression that hangs like a pall over our land, but, as faithful trustees, we feel that we should make known to you the pressing needs of the institution. We leave the matter in your hands, confident in the belief that as faithful, patriotic representatives of the people, you will do all in your power to relieve the situation.

We would like to call your attention to the continual decline in the income from the fertilizer inspection tags. The decline of revenue from this source is so great as to impair the activities of Clemson College at a time when agriculture is more in need of its agricultural college than it ever has been before.

Very truly yours,
John E. Wannamaker
President, Board of Trustees.

December 31, 1931

CLEMSON AGRICULTURAL COLLEGE

Clemson College (The Agricultural and Mechanical College of South Carolina) renders two major lines of service.

1 Collegiate Instruction

Courses leading to the B. S. degree in the following:

Agriculture
Architecture
Arts and Science
Chemistry
Engineering
Agricultural Education
Industrial Education
Textiles

Summer School in Vocational Subjects

2 Public Service

Agricultural Research—Clemson, Florence, Pontiac and Summerville Experiment Stations.
Cooperative experiments with farmers.

Textile Research—At Clemson, manufacturing tests —grades, staples, varieties—in cooperation with U. S. D. A.

Textile Testing—At Clemson, yarn testing service for cotton mills of South Carolina.

Agricultural Extension—County agents serve in counties. Specialists serve any point in the State on request.

Livestock Sanitary Work—Veterinarians are located in various parts of the State for control and eradication of infectious and contagious diseases.

Fertilizer InspectIion—Inspects the fertilizer bought and sold in the State.

State Crop Pest Service—Study and control of contagious plant diseases and insect pests.

Report of the President of the College

Clemson College, S. C.
December 31, 1931

From E. W. Sikes,
President of The Clemson Agricultural College

To Honorable John E. Wannamaker,
President of the Board of Trustees.

Dear Sir:

I have the honor to present to you the forty-second report of the President of Clemson College, this report covering the thirty-eighth session of the institution.

The Agricultural and Mechanical Colleges of the United States are a unique part of our educational system. The earlier colleges were transported from Europe and modeled after European institutions. The Agricultural and Mechanical Colleges took no model but have had a development that was distinctly American. The Land Grant Act of 1862 authorizing the use of public lands for the founding of Agricultural and Mechanical Colleges was the beginning of such colleges. The older colleges rested their curriculum on a verbalistic basis, the new on science; it was a change from the study of words to the study of things. The earlier system was well-fitted to produce orators like Clay, Webster, and Calhoun, but such a system was not adequate to meet the needs of a rising agricultural and industrial democracy. The advocates of the new departure called attention to the fact that physicians were not educated in law schools nor ministers in medical colleges, and that, therefore, they claimed the same privilege for agriculture and the mechanic arts. The establishment of colleges with science as the core of the curriculum was a great shock to the leading educators. It had been held that education and utility were exclusive terms. Any research that might be of use in industry was dubbed commercial. The Agricultural and Mechanical Colleges were founded with the open and avowed purpose of improving the living conditions of the agricultural and mechanical groups; many bemoaned the "prostituting of the sacred cause of education to the business of making a living".

These new colleges soon found out that the art of farming could not be taught on a college basis; that the practices of farmers disagreed and that many of them would not stand the light of investigation. The teachers soon found themselves bewildered by conflicting farm practices. However, science was at hand ready to begin research. Laboratories were essential to such work, and so in 1887 the Hatch Act was passed establishing Experiment Stations, which have made incalculable additions to agriculture and the rewards of farming. The Experiment Stations have done the pioneering. They have worked out methods of increasing quality and quantity in economical ways; the Extension Department has carried this service to the people. The Agricultural and Mechanical Colleges have had the democratic spirit and have not been content to do work on the campus only, but have carried the findings to the people on the farms and in their homes. Clemson College has spent $457,895.80 of its fertilizer tax not on the campus, but in serving the people throughout the State.

The influence of these institutions has been felt in the older type of colleges, and many of them now have departments of agriculture, engineering and forestry. They have influenced the public schools until they have become more responsive to the economic needs of their constituency by adding courses in agriculture and industry. Through science these schools have changed "farming", which was an art, to "agriculture", which is a science; and "mechanic arts", to "engineering"; have dignified industry and agriculture, and made over-alls respectable. In the earlier days there were only four vocations for a college graduate—ministry, law, medicine, and teaching; now there are three thousand.

These institutions today not only provide instruction for the young men who present themselves on the campus, but they look beyond the individual student to service to the public. They exist for the development of the industries of the State; they are instruments of progress. The colleges no longer exist simply for the student and for his personal advancement; today the student is not an end but the means the college uses for the advancement of civilization and the improvement of the State. More than a hundred thousand letters of inquiry are answered yearly by the Agricultural Extension Department of the College; more than a hundred experiments are conducted yearly by the Experiment Stations to assist the farmers in more economical production, in im-

proved quality, and increased yields. Agricultural teaching in the college and in the high school must be based on continuous research, hence there can be little stock knowledge stored up in books. The school teachers and the extension teachers must take the most recent findings of research and popularize them. In these ways the college becomes an agency of progress.

For example, research in cotton has resulted during the last three years of an average yield per acre of fifty-seven pounds over a previous three year period; grazing hogs on soybeans saved two dollars per hog; prevention of the barreness of some of our best varieties of apples; the saving of certain peach orchards by the introduction of a proper parasite. These researches, carried to the farmers by the Extension Department and the agricultural teachers in the high schools, have saved thousands of dollars.

Jefferson had the vision though it was not realized in the university he founded. His dream of democracy is being realized through the influence of these colleges. To use the epigram of another—"If these colleges fail neither democracy's goal of education nor education's goal of democracy will be reached".

Though Clemson College is still a young institution, the State does not have to go beyond its own borders to find men who can build or rebuild any of its railroads, who can bridge any of its rivers, who can handle any of its textile plants, who can erect any of its buildings, who can equal any in the growth of quality cotton, and who lead all the states in "the-live-at--home" policy on the farms.

The reports that follow will reveal the nature of its work, the policy of instruction, and the financial condition.

The following table shows the appropriations for maintaining the six state colleges, Clemson College, vocational high school teaching and other educational activities in agriculture; it also shows the amounts appropriated out of every hundred dollars for each specific purpose. This table shows the part borne by farm property; it is small but that is as it should be. Agriculture is today based on the use of scientific information—research and dissemination are its great needs. This table was proposed by Mr. G. H. Aull, Assistant Director of the South Carolina Agricultural Experiment Station.

The Cost of Certain State Appropriations to The Taxpayers of South Carolina

Total **assessed** value of all property	$426,000,000
Assessment Railroad, City, Etc., property	236,000,000
Balance = **farm** and unclassified property	$190,000,000
Aggregate taxes on **all** property	22,500,000
Aggregate taxes on farm and unclassified property	9,900,000

Certain 1931 Appropriations:	Six State Colleges $1,336,000	Vocational High Schools $137,482.62	Agricultural Extension $243,441.40	Agricultural Research $75,000	Clemson College $190,000
These Appropriations Represent:					
For each $100.00 assessed value of **all** property ---	$0.31	$0.03	$0.06	$0.017	$0.04
The share of farm and unclassified property in this assessment ----	0.14	0.01	0.03	0.007	0.02
For each $100.00 taxes paid on all property ------	1.48	0.15	0.27	0.083	0.21
Of this farm and unclassified property pays-----	0.64	0.07	0.12	0.036	0.09

COLLEGE FINANCES

From J. C. Littlejohn, Business Manager

To President E. W. Sikes.

The Treasurer's Annual Report which is published separately in this volume gives full accounting for all funds. Not only does this statement include the money appropriated by the Legislature, but in addition all Federal funds, all funds for student living expenses, all revolving funds and even the small trust funds to be used for research or other work. Every dollar paid in by the students for their living expenses is handled in the same manner as State or Federal Funds.

The Fertilizer Tax

After the acceptance of the Clemson bequest, the supporters of the College in 1890 proposed that the tax of 25 cents per ton on all fertilizers sold within the State be placed at the disposal of the Trustees, who would carry on an efficient system of inspection and analysis and with the balance they would "erect and maintain" an agricultural college.

The records show that for thirty years the Trustees developed the College, both in size and diversity to care for a growing student body, with the Fertilizer Tax as the principal source of income. Those entrusted with the welfare of Clemson College went a step further. Realizing that South Carolina was predominantly an agricultural state and having in mind the interests of her people back home, it was with foresight and wisdom that the Trustees sacrificed needed buildings and equipment on the campus of a growing college to lay the foundation for that splendid structure of Public Service now financed by State and Federal appropriations as it should be. Through all these years the Trustees clung to the idea that the campus of Clemson should be the whole State and not the few hundred acres surrounding the college buildings. In addition, the Legislature placed certain duties upon the College which were not in the original bargain, such as agricultural and textile scholarships, to be financed from the Fertilizer Tax.

All Public Service activities are now paid from State and Federal appropriations, but the following were started and financed for a time from the Fertilizer Tax:

1—Agricultural Experiment Stations
2—Agricultural Research
3—Agricultural Extension Work
4—Live Stock Sanitary Work
5—Crop Pests and Diseases
6—Miscellaneous

Totals for Items 1 to 6 from Fertilizer Tax_____$457,895.80
7—Scholarships which are still paid from Fertilizer Tax_____ 415,825.34
Total Cost of Service not in the Original Bargain, but Performed by Clemson _____$873,721.14

This represents a sum of money, which if available today would more than furnish the College with the needed buildings and equipment.

In point of years Clemson is a very young institution, but in point of service it stands to the front. From the year the first class graduated in 1896 to 1926—a period of thirty years—the enrollment had multiplied itself by three and by 1931 there were nearly four times the students enrolled in 1896. The people of this State had been convinced of the value of this young institution through the service performed, and their representatives in the Legislature very wisely

made provisions for the carrying on of the Public Service Activities as well as taking care of the growing student body.

The uncertainties of the Fertilizer Tax and the steady growth in the number of students are revealed in the following table:

Year		Fertilizer Tag Tax	Enrollment
1910-1911		$ 246,374.08	683
1915-1916		171,018.52	802
1920-1921		167,505.16	847
1925-1926		209,000.00	1032
1930-1931		150,000.00	1337
1931-1932	Probably	100,000.00	1228

Last session the Fertilizer Tax was the lowest in twenty-five years, except for 1922, which was more than offset by 1920 being the highest. What the Tax will be for the year 1932 no one can tell, but it will do well to reach the total of thirty years ago.

When Clemson's student body was smaller, the institution shared its income with the farmers of South Carolina who made its existence possible. Today when the very existence of the college is threatened by the small Fertilizer Tax, the Trustees believe that when the facts are known the great educational work will not be permitted to suffer.

The Present Session

The collegiate year runs from July 1st to June 30th next. The present session was entered into with much interest and great anxiety, but to date the enrollment is 1228 students. The enrollment to date is approximately equal to the total enrollment for the session 1929-30 and is about 200 more than the total enrollment for 1925-26.

In spite of the growth in the student body the budget for 1931-32 has been cut back to approximately what it was in 1926-27—five years ago. For the collegiate year ending June 30, 1932, the cost of operating the college is estimated to be:

Collegiate Activities
Fiscal Year 1931-1932

Estimated Expenditures

1—Teaching Departments	$291,503.00
2—Superintendence and Records	40,896.00
3—Upkeep Buildings and Grounds	20,092.00
4—Public Utilities	17,950.00
Total for College Teaching Work	$370,441.00
5—Agricultural and Textile Scholarships	$ 17,000.00
6—Fertilizer Insp. & Anal.	24,000.00
	$ 41,000.00

Items 5 and 6 are paid from the Fertilizer Tax, but are not a part of the teaching work of the College. The cost of these activities is deducted from the Fertilizer Tax and the remainder goes toward operating the College.

Prospective Income

7—Interest on Clemson Bequest		$ 3,512.36
8—Interest on Landscrip (U. S.)		5,754.00
9—Morrill and Nelson Fund (U. S.)		25,000.00
10—Estimated Student Fees		51,900.00
11—Miscellaneous		3,000.00
		$ 89,166.36
12—Estimated 1932 Fertilizer Tax	$100,000.00	
Less cost Items 5 and 6 above		
Scholarships $17,000.00		
Fert. Inspt. Anal. 24,000.00	41,000.00	59,000.00
13—Appropriation requested for 1932		190,000.00
Total Estimated Current Income		$338,166.36
14—Necessary to Supplement Current Income in Order to meet Obligations		32,274.64
		$370,441.00

Item 14. The Fertilizer Tax is collected almost entirely during the months of January to April inclusive, but is for use over a twelve months period. Since the college fiscal year ends on June 30th approximately half the tax must be carried forward for use during the time from July to December when there are practically no returns from this source. Fifteen to twenty years ago the income from this source was anticipated and pledged to the banks for loans with which to operate during the period of small fertilizer sales. By the application of the strictest economy and the closest scrutiny of all expenditures, the college was able to change this method of financing, and now the bulk of the Fertilizer Tax for operation is collected before it is spent.

The student fees available for collegiate instruction have always been set up as a part of the regular income for operating expenses and for this reason Clemson has not shared in the use of such fees for permanent improvements. Should these ever be diverted from operating expenses, it will be necessary to replace them from other sources.

The college pays each employee a cash salary. The residences are rented to teachers and officers who pay a regular commercial rental and who also pay for all public utility service such as lights and water.

In the teaching of students in an agricultural and mechanical college there are consumed such items as iron, wood, coal, feedstuffs for live stock and even live stock itself, not to mention numerous other items. Equipment of almost every description must be bought and kept up to date. To withhold the necessary supplies and equipment would not be fair to the students whose time and money are being spent for an education.

At Clemson the student interests are self-supporting, in that neither the college nor the state contributes any funds toward upkeep or operation of the dining hall, hospital, physician, dormitories, laundry, etc.

Conclusions

The State entered into an agreement with the Trustees to "erect and maintain" a college on the Fertilizer Tax for the very purpose of giving an adequate support, but neither the Trustees nor the Legislature could foresee the growth of the institution nor the present financial conditions.

The College must ask the General Assembly to guarantee a sum sufficient to care for the present student body of over 1200 young men, or it must reorganize on the basis of a small faculty and a smaller student body, and must face the necessity of eliminating the $17,000 for agricultural and textile scholarships paid from the Fertilizer Tax.

During the last five years the student body increased approximately 24 per cent or 250 individuals and during this period the Legislature provided for the necessary increase in Personal Service.

In 1929-30 the Fertilizer Tax was $180,000.00, but for 1931-32 it will do well to reach $100,000.00. This is a decrease in income of at least $80,000.00 from this source alone. In 1931 the State Appropriation was reduced from $208,000.00 to $190,000.00—a decrease in this source of $18,000.00. The principle sources of income for the present college year will therefore show a decrease of approximately $98,000.00 as compared with two years ago.

The reduction of $18,000,000 in Personal Service for 1931 was absorbed by a reduction of salaries ranging from 20 per cent to 5 per cent. The reduction in the Fertilizer Tax for 1931 was absorbed by not purchasing teaching equipment and by limiting the amount of educational supplies.

As public servants responsible to the State for the operation of a college which represents vocationally the largest group of our people, the Trustees bring these facts to the attention of the Legislature, asking for the year 1932—

(a) That the sum of $190,000.00 be provided for "Collegiate Activities".

(b) That for the year 1932 the college should receive other revenues to provide for the increase in students and to help care for the abnormal decrease in Fertilizer Tax. For 1932 this will amount to $32,274.64.

In presenting these requests the College does not come as a suppliant, begging that they be granted; but as a partner in a great public enterprise and feeling that they will be met wisely and sympathetically by that honorable body.

COLLEGIATE INSTRUCTION

From W. H. Washington, Registrar
To President E. W. Sikes.

The total enrollment to date is 1228. By courses the enrollment is as follows:

Engineering—Civil, Electrical, Mechanical, Industrial Education, and Architecture	493
Agriculture	401
Textile—Including Textile Industrial Education, and Textile Chemistry and Dyeing	165
Arts and Science	101
Chemistry	68

The distribution as to number of subjects taken is as follows:

Number taking only one subject	3
Number taking only two subjects	0
Number taking only three subjects	1
Number taking only four subjects	1
Number taking five or more subjects	1223

The total enrollment during the history of the college is more than 12,000. The total number of graduates is 3,307.

Acknowledged Obligations

The first function of a college is to provide good teaching, the first duty of a student is to search for knowledge. There are social aims which are generally recognized; there are administrative functions that are necessary; but we should never lose sight of the student and the teacher as principal actors in the Drama of Education.

The Purpose of the Founders of Clemson

Clemson men are carrying out that part of Clemson's will accepted by the legislature, which states: "My purpose is to establish an Agricultural College which will afford useful information to the farmers and mechanics . . . .". The report of a study published by the State Department of Education, Columbia, South Carolina, 1930, shows that 184 Clemson men are teaching in the high schools of South Carolina. This figure is larger than that of any other man's college or co-educational institution in the State.

A further analysis of the service in this field indicates that of the 147 white teachers of Agriculture in this State, 145 have received some resident training at Clemson, and 130 of these men are Clemson graduates. The College is conducting itinerant teacher training in Agricultural Education, and has reached 100 men with additional training in this field during the past two sessions. The men who conduct itinerant teacher training carry the latest experiment station information, in teachable form, directly to these vocational teachers. These Agricultural teachers, in turn, are able to give their all-day classes as well as their evening classes for farmers the benefit of this service. In addition to the group mentioned above, there are in the Agricultural Extension Service of this State nearly 50 Clemson men who are carrying agricultural information directly to the farmers. Of course the College as a whole is interested in all the extension service whose staff constitutes a "field faculty", whose activities are educational and whose work is fully described in the report of the Director of Extension.

In the field of industry Clemson men serve not only as managers, superintendents, and technical experts, but are likewise carrying information to the people. There are many industrial departments in the high schools of the State. A large number of Clemson men are teaching vocational evening classes for textile workers. Here again the College renders a distinct service through its cooperation with the State Department in conducting itinerant teacher training in the field.

At Clemson practically every department is a service department for some other part of the College; for example, the Engineering Department teaches forge and wood shop to students of Agriculture as well as to Engineering students. The English Department teaches Agricultural, Engineering, Textile, and Chemistry students as well as Arts and Science students. There is a fine spirit of cooperation and great economy is effected by this scheme.

During the current session Agricultural Engineering has been added to the curriculum as a major subject. The degree of bachelor of science is to be offered by the Agricultural and the Engineering Departments cooperatively. Textile Chemistry and Dyeing has a good enrollment for a new major subject.

The spirit of the faculty was expressed by it when it passed a resolution requesting the President to appoint a committee to consider modifications of any curriculum to fit the needs of any serious-minded student who has definite vocational plans for which no curriculum of the college offers preparation, provided that the committee approves the student's plans and that no new courses will be called for. In this way no added costs are involved but the individual student may have the full service of the institution. This is merely another effort to break the lock step in the curriculum.

Scholarship

Scholarship is a primary objective, or should be, in every institution. At Clemson honor scholarship organizations give recognition to scholastic achievement. The Tau Beta Pi, Phi Psi, and Alpha Zeta are for Engineering, Textile, and Agricultural students, respectively. Recently the faculty devised a plan designed to stimulate scholarship.

That scholarship is paramount in the minds of many students of Clemson is indicated by the number who go on for graduate and further professional study. During the present session Clemson graduates were awarded fellowships and assistantships as follows:

Columbia University _____ G. E. Metz '27
University of Minnesota _____ B. O. Williams '18
University of Tennessee _____T. W. Neely '31
University of Florida _____ M. C. Rochester '31
University of Florida _____ J. O. Rowell '31
University of Kentucky _____ Frank Sowell '31
Ohio State University _____ F. B. Whittington '31
University of Minnesota _____ G. H. Wise '31

Other Clemson men have taken graduate work at the following institutions during the past few years: University of Virginia, University of Chicago, University of Maryland, University of Missouri, University of South Carolina, University of North Carolina, Iowa State College, Cornell University, Rutgers University, University of Wisconsin, Princeton University and others.

Teacher Training

Clemson has been doing specific vocational teacher training since 1917. Immediately upon the enactment of the Smith-Hughes Act and its acceptance by the legislature of South Carolina, the College inaugurated a teacher-training program in cooperation with the State Board of Vocational Education. During this fourteen year period the work has progressed very satisfactorily. Training is more than telling; it includes participation. More than 95 per cent of the students who have completed the training for teachers of agriculture have actually entered upon the vocation of teaching, and the demand for trained teachers has been growing. It is doubtful if the professional schools of law, medicine, and the ministry excel this record. In fact the training of teachers for doing evening class work with farmers has been so successful that the Federal Board for Vocational Education published a report on that work as Bulletin No. 129. Members of the training staff of Clemson have been invited to assist other states by teaching in summer schools, appearing on teacher-training programs of the American Vocational Association at Philadelphia, The Northeastern Regional Conference of Vocational Agricultural Education workers at Boston, and other meetings and by having visitors come to Clemson to inspect the work.

Teacher training has been offered in Industrial Education since 1918. Many of the men taking that work are now employed as industrial teachers in the public schools of this state. Others are teaching in other states and many are teaching in vocational evening classes for textile workers and others.

Since vocational education is specific training, the Smith-Hughes Act makes special provisions for teacher training and provides funds for such work which cannot be used for other purposes. Well trained teachers have been in demand; and the work in the State cannot go beyond the vision of the teachers in charge. Therefore, the College is interested in continuing the work that has met with such wide-spread approval and in developing further the carrying of specific information to the teacher on the job through its publications and through systematic itinerant teacher training both in Agriculture and in the Trades and Industries. The State should be benefited through direct contact with what Clemson has developed in these two major vocations—agriculture and industry—in the past 38 years.

How Clemson is Different

The very nature of the instruction at a college like Clemson makes it different from the older type college. The text-book and the lecture are not unknown, but the core of the instruction is based upon the facts discovered in the laboratory, the textile mill, the experimental plot of the agricultural experiment station, the classroom of the practice school, and the cooperating farms of the state. Likewise the faculty must be different. The professor must keep abreast of the progress of science. Applied science meets immediate and exacting tests in the Agricultural and Industrial world. The man who can not and does not keep pace with progress has no place on the faculty of a college like Clemson.

The number of hours a teacher must be with his classes is larger in a technical school than in the liberal arts school. At Clemson the students are with their teachers from 25 to 43 hours per week, while in a liberal arts college the average is usually not over 16.

Again, this type of education is not a cheap product. An effort is made to give freshmen as good teachers as seniors have. The conscientious teacher who walks holding scientific progress in one hand and with the other leads a class of boys is a professional laborer worthy of his hire. Parents of South Carolina would want none but the capable to lead their sons.

Agricultural, Engineering, Textile, Education Costs

Educational cost studies have not been general. One reason for this is that there is no universally accepted unit; however, within the past few years a few efforts in this direction have been made. In no case can the exact unit cost at one institution be compared with the unit cost at another

institution; however, these studies do give a basis for comparaive costs within the institutions studied. These studies bear out our contention that technological education is generally more expensive than the academic work. *Association Report No.* 38, *Part II*, published by the California Taxpayers' Association, Los Angeles, 1931, Page 39, "Agricultural instruction four times as costly as academic work." This study shows that the cost of instruction in Agriculture was roughly four times as great as the academic work of the University of California. Of course there may be local reasons which contribute to the difference.

A study of the higher institutions of Texas published as *Texas Educational Survey Report, Vol. VI*, 1925, gives information on this point. That report shows that in the University of Texas the average salary cost per student credit hour in the College of Engineering was approximately 50 per cent more than that same unit cost in the College of Arts and Sciences. This report shows further that in the Texas Agricultural and Mechanical College the salary cost per student credit hour in the Agricultural Department was more than 50 per cent higher than in the Academic Department. While the cost in the Engineering Department exceeded the cost in the Academic Department, it was not as high as in Agriculture.

An older study, made in the University of Illinois and contained in the President's report for the year 1922-1923, shows that the gross current expenses of instruction per student credit hour in the College of Agriculture was nearly three times as great as in the College of Arts and Sciences, while the Engineering unit cost was nearly twice as great.

At Clemson College the unit teaching salary cost is greatest in the Textile Department, which is followed by Agriculture, Engineering, Chemistry, and Arts and Science in the order given. The highest is about twice as expensive as the lowest.

Cost to the Student

Attention should be called to the fact that comparisons of costs by officials as well as prospective students and their parents are often misleading. At Clemson the figures quoted in the catalog cover "living expenses" as well as college attendance. When a student makes his full payment to the Treasurer, that student is entitled to a complete outfit of clothing—as good as the best dressed man on the campus; admission to all classes and laboratories of his chosen course

—with no additional laboratory fee or other special fee, board for the quarter, room, laundry—unlimited; heat, light, and water; hospital facilities—he is not sent out to some nearby town or city hospital so long as he can be cared for here. The Clemson hospital is more than an infirmary or clinic. The student is entitled to membership in the Y. M. C. A. and subscription to the student newspaper. He also has the privilege of free banking service at the Treasurer's Office. Therefore, comparisons should include similar items.

In the matter of uniform the cost has dropped nearly 50 per cent in the past three years. A committee consisting of an expert in military dress, an expert on textile fabrics, and a good business judge let these uniform contracts to the lowest responsible bidder, quality considered. There is a difference between an "in-stock" uniform and one purchased under the plan in vogue at Clemson. The College does not accept a cent for its service to the student; but it merely acts as an agent for the student.

Discipline

During the past few years the conception of the purpose of discipline has changed in the minds of many parents. Home life has changed. Military discipline in miltary organizations has likewise changed. In industry discipline is no longer carried out by the task master under the old slogan "fire a few now and then put the fear of God in the rest of them". Personnel management, industrial management, cooperation, profit sharing, etc., are some of the terms that describe the new ideal. The administration at Clemson admits a change here. Our hope is to make better men, not through fear, but through an abiding interest. More and more students assume responsibility for certain phases of student life. In other cases the faculty frankly shoulders its responsibility, as in the case of dishonest class work, described on page 20 and the misfit is caused to realize that the environment is not congenial and voluntarily drops out in many cases. One is impressed by the frankness of students who come for confidential personal interviews. They are frank, honest in most cases, and realize more than we often think their real status. To such a student whose record shows, and who himself admits a lack of purpose and interest, the question often asked is: "What is the fair thing for you to do for yourself? your parents? your college? and your State?" He makes the decision and quite often his decision is to drop out or go to work. It seems better that the student assume that responsibility rather than be

summoned before a discipline committee for a contest of wits and evasions where a technical victory may be a moral loss.

We do not believe that this change has injured scholarship, as evidenced by the fact that recent Clemson graduates have entered into keen scholastic competition in their graduate work in the larger institutions. There they have almost invariably given a good account of themselves. Nor do we believe the military organization disrupted. Last year Clemton took first place in military competition with the leading military institution of the South, being awarded the cup for the best drilled platoon at Fort McClellan, Alabama.

Day Cadets, Day Students

Some critics bemoan the fact that a few students live outside barracks. There are now more than seventy-five students who live thus. When barracks accommodations were taxed, to over-crowd barracks was not desirable. Therefore, if a student could present a real reason for a changed status and a plan that met approval, he changed. In fact we have enrolled men who were over forty years of age, ministers, a doctor, and at present we have in school three fine young men who are being sent through the assistance of friends and the Rehabilitation work of the State. They could never meet all the physical requirements some might enforce. Yet they are citizens of South Carolina and we admire their courage and feel that every citizen who knows of their efforts will feel a bit prouder of his State for providing the opportunity these young men now enjoy at Clemson.

Honesty

The question of honesty in class work, quizzes, and examinations seems to be a problem with many colleges. During the past year the faculty at Clemson seems to have evolved a satisfactory plan for coping with this evil. No longer do they expect a student to report his fellow student. Students just do not report each other. According to present plans each instructor makes an effort to encourage honesty. If a student fails to live up, he is dropped from that subject. If he repeats the act of dishonesty, he is dropped from College on the second offense. The object of this rule is to encourage and train boys to be honest.

Organization for Instruction

The organization of the college has not changed and the instructional work still comes under the direct supervision of the Directors of Departments, and under them the Heads

of Divisions who are generally full professors under whom associate and assistant professors and instructors carry out their teaching. Certain committees are now rendering a worthwhile service. Last year the President appointed a special faculty committee on Deficient Students. This committee has reviewed the records of deficient students. Arrangements for special interviews have been made. Many of the students have made improvement. This committee is very conscientious in its work; it looks first to the best interest of the student. The recommendations of this committee form a most worthwhile basis for administrative action.

The committee on Reexaminations and Promotions continues to act as the administrative committee on scholastic standing. At the end of the session it reviews the records of all students and classifies them as: (1) "Promoted"; (2) "Promoted, but deficient and warned"; (3) "Not promoted, advised that extra work will be necessary for graduation in the allotted time"; (4) "Not promoted, advised not to return"; (5) "Not promoted, not allowed to re-enter without special application". In all cases the student's record, his health, and every other factor known to the committee is considered.

The instructional work of the College seems to be progressing in a satisfactory manner. No serious questions have been raised by the accrediting authorities. The faculty has evidenced a renewed interest in scholarship.

Summer Instructional Activities

Instructional activities of the College do not cease with the June Commencement. During last summer the Trade and Industrial teachers held their summer teacher-training program at Clemson. Mr. C. M. Wilson, State Supervisor of that work, was here for that occasion. The group of teachers present voted to return in 1932 The Clemson Summer School ran for six weeks. The Cotton Graders' Course extended for four weeks. A new feature was the Opportunity School fostered by Miss Wil Lou Gray, State Supervisor of Adult Education. Dr. Tilton of Yale University and Dean Gray of the University of Chicago, who were here in the interest of the work, spoke very highly of the work accomplished. Numerous groups of 4-H club boys were here for short courses. In fact there is hardly a time when some phase of educational work is not going on. During last summer 1,125 individuals were enrolled for some type of instruction. There is no general summer "shut down" at Clemson.

Respectfully submitted,
E. W. Sikes, President.

ENROLLMENT OF COUNTIES AND STATES FOR 1931-1932

COUNTY	TOTAL
Abbeville	17
Allendale	11
Aiken	20
Anderson	85
Bamberg	12
Barnwell	8
Beaufort	8
Berkeley	4
Calhoun	5
Charleston	56
Cherokee	10
Chester	24
Chesterfield	11
Clarendon	9
Colleton	14
Darlington	21
Dillon	10
Dorchester	7
Edgefield	14
Fairfield	16
Florence	49
Georgetown	11
Greenville	89
Greenwood	43
Hampton	16
Horry	14
Jasper	4
Kershaw	8
Lancaster	12
Laurens	38
Lee	10
Lexington	12
Marion	14
Marlboro	18
McCormick	14
Newberry	30
Oconee	47
Orangeburg	37
Pickens	64
Richland	45
Saluda	18
Spartanburg	83
Sumter	24
Union	19
Williamsburg	12
York	46
Total for South Carolina	1139

STATE	TOTAL
Alabama	1
Connecticut	2
District of Columbia	1
Florida	12
Georgia	29
Illinois	2
Kentucky	1
Louisiana	1
Maryland	1
Michigan	1
New Hampshire	1
New Jersey	4
New York	2
North Carolina	18
Pennsylvania	2
South Carolina	1139
Tennessee	3
Texas	2
Virginia	1
West Virginia	2
Wisconsin	3
Grand Total	1228

OCCUPATIONS OF PARENTS

OCCUPATION	TOTAL
Agriculture	462
Manufacturing and Mechanical Industries	153
Transportation	79
Trade	268
Public Service	50
Professional Service	114
Domestic and Personal Service	4
Clerical Occupations	22
Not given	76
Total	1228

CLASSIFICATION OF STUDENTS AS REGARDS PAYMENT OF TUITION AND HOLDING OF AGRICULTURAL AND TEXTILE SCHOLARSHIPS

Name	Classification	County
Abell, F. E.	Non-Tuition	Chester
Abell, R. W.	Non-Tuition	Chester
Abernathy, W. C.	Non-Tuition	Chester
Able, W. E.	Tuition	Saluda
Abrams, C.	Non-Tuition	Newberry
Abrams, E. C.	Non-Tuition	Newberry
Abrams, M. S.	Non-Tuition	Newberry
Ackerman, W. E.	Non-Tuition	Colleton
Adair, J. R.	Non-Tuition	Laurens
Adair, S. W.	Non-Tuition	Laurens
Adams, C. W.	Tuition	Oconee
Adams, E. J.	Tuition	Birmingham, Ala.
Adams, J. G.	Non-Tuition	York
Adams, L. M.	Non-Tuition	York
Adams, O. A.	Non-Tuition	Pickens
Adams, W. C.	Non-Tuition	York
Albright, H. T.	Tuition	Palmyra, N. J.
Alexander, C. B.	Non-Tuition	Pickens
Alexander, W.	Non-Tuition	Pickens
Alford, J. C.	Non-Tuition	Lexington
All, R. A.	Non-Tuition	Allendale
Allan, R. H.	Tuition	Charleston
Allen, E. L.	Scholarship	Allendale
Allen, J. R.	Non-Tuition	Williamsburg
Allen, W. P.	Non-Tuition	Marlboro
Allgood, B. A.	Tuition	Pickens
Allison, L. M.	Non-Tuition	Richland
Alston, C. S.	Tuition	Union
Anderson, E. B.	Non-Tuition	Horry
Anderson, G. R.	Tuition	Florence
Anderson, J. B.	Non-Tuition	Marlboro
Anderson, J. E.	Tuition	Florence
Anderson, P. B.	Non-Tuition	Florence
Anderson, T. F.	Non-Tuition	Oconee
Anderson, T. W.	Non-Tuition	Horry
Arant, J. A.	Tuition	Chesterfield
Arguello, R.	Tuition	Leon, Nicaragua
Armstrong, E. S.	Non-Tuition	York
Armstrong, W. R.	Non-Tuition	Anderson
Arnold, H. W.	Non-Tuition	Anderson
Arrington, C. A.	Non-Tuition	Greenwood
Arrington, W. S.	Non-Tuition	McCormick
Arthur, C. G.	Tuition	Richmond, Va.
Ashmore, W. G.	Scholarship	Greenville
Atkinson, D. H.	Tuition	Orangeburg
Aull, L. E.	Scholarship	Newberry
Avinger, J. J.	Non-Tuition	Berkeley
Babb, W. C.	Non-Tuition	Anderson
Baer, C. L. H.	Non-Tuition	Spartanburg
Bagnal, J. G.	Tuition	Sumter
Bagwell, L. E.	Tuition	Laurens
Bailey, F. P.	Scholarship	McCormick
Bailey, R. W.	Tuition	Spartanburg
Bailey, T. M.	Tuition	Greenville
Bailey, W. J.	Non-Tuition	Spartanburg
Baker, J. E.	Scholarship	Williamsburg
Baldwin, W. R.	Non-Tuition	Orangeburg
Ballentine, J. M.	Non-Tuition	Anderson
Ballentine, L. W.	Non-Tuition	Dorchester
Ballentine, R. H,	Non-Tuition	Richland
Ballew.H. M.	Non-Tuition	Greenville
Bane, P. W.	Non-Tuition	Marion
Banister, C. L.	Tuition	Chester
Barbare, L. J.	Non-Tuition	Greenville
Barber, J. C.	Tuition	Chester
Barber, W. B.	Scholarship	Chester
Barnes, D. A.	Scholarship	Kershaw
Barnes, H. R.	Tuition	Florence
Barnes, V. M.	Non-Tuition	Anderson
Barnes, W. C.	Non-Tuition	Hampton
Barnett, G. M.	Scholarship	Oconee
Barnett, T. M.	Non-Tuition	York
Barney, J. N.	Tuition	Fredericksburg, Va.
Barnwell, J. B.	Non-Tuition	Florence
Barnwell, J. G.	Tuition	Newberry
Barnwell, W. M.	Non-Tuition	Charleston
Barr, E. L.	Tuition	Milwaukee. Wis.
Barre, C. B.	Tuition	Pickens
Barron, T. L.	Tuition	Cave Springs, Ga.
Barron, W. W.	Tuition	Elberton, Ga.
Barron, Z. P.	Tuition	Newman, Ga.
Barton, P. S.	Non-Tuition	Oconee
Basha, G.	Scholarship	Charleston
Baskin, N. F.	Tuition	Lee
Bates, H. C.	Non-Tuition	Greenville
Bauknight, H. D.	Non-Tuition	Richland
Bearden, F. E.	Non-Tuition	Spartanburg
Beaudrot, C. L.	Non-Tuition	Greenwood
Beckham, H. B.	Tuition	Lancaster
Beckham, H. J.	Tuition	Lancaster
Belcher, W. E.	Scholarship	Anderson
Bell, J. U.	Tuition	Lancaster
Bellamy, R. L.	Non-Tuition	Horry
Bennett, J.	Tuition	Orangeburg
Bennett, O. L.	Tuition	Spartanburg
Bennett, W. T.	Non-Tuition	Bamberg
Berelowitz, B. R.	Tuition	Newberry
Berry, C. C.	Non-Tuition	Orangeburg
Berry, P. M.	Non-Tuition	Colleton
Berry, T. R.	Non-Tuition	Newberry

CLASSIFICATION OF STUDENTS AS REGARDS PAYMENT OF TUITION AND HOLDING OF AGRICULTURAL AND TEXTILE SCHOLARSHIPS—(Continued)

Name	Classification	County
Best, B. W.	Tuition	Kershaw
Bethea, H. M.	Tuition	Dillon
Bethea, V. L.	Tuition	Marlboro
Bevill, J. B.	Non-Tuition	Anderson
Bickley, L. C.	Tuition	Richland
Bickley, V. L.	Non-Tuition	Lexington
Bigger, E. W.	Non-Tuition	York
Bigger, T. C.	Scholarship	York
Bishop, J. K.	Scholarship	Orangeburg
Bishop, R. L.	Non-Tuition	Spartanburg
Bissett, T. J.	Tuition	Tampa, Fla.
Black, E. O.	Tuition	Richland
Black, G. A.	Non-Tuition	Laurens
Black, L. C.	Non-Tuition	Barnwell
Black, O. W.	Non-Tuition	Lexington
Black, R. E.	Non-Tuition	Newberry
Blackman, S. M.	Non-Tuition	Anderson
Blackmon, C. R.	Non-Tuition	Lancaster
Blackwell, D. S.	Scholarship	Sumter
Blackwell, J. E.	Non-Tuition	McCormick
Blake, L. D.	Tuition	Anderson
Blakely, R. W.	Scholarship	Greenville
Blakeney, W. C,	Non-Tuition	Lancaster
Blanton, A. J.	Tuition	Cherokee
Blitch, M. S. J.	Tuition	Charleston
Blocker, F. A.	Non-Tuition	Colleton
Bobb, M. L.	Scholarship	Newberry
Bodiford, H. O.	Non-Tuition	Barnwell
Boggs, H. B.	Non-Tuition	Pickens
Boggs, H. Q.	Non-Tuition	Pickens
Boland, W. F.	Non-Tuition	Newberry
Boland, G. C.	Non-Tuition	Orangeburg
Bone, H. G.	Non-Tuition	Abbeville
Booth, H. C.	Tuition	Sumter
Booth, P. M.	Scholarship	Horry
Boroughs, P. C.	Non-Tuition	Pickens
Bouknight, M. A.	Non-Tuition	Richland
Bouknight, V. A.	Non-Tuition	Newberry
Boulware, J. H.	Non-Tuition	Newberry
Bowen, E. H.	Non-Tuition	Pickens
Bowen, R. L.	Non-Tuition	Spartanburg
Bowen, T. O.	Non-Tuition	Pickens
Bowen, W. C.	Non-Tuition	Pickens
Bowen, W. W.	Non-Tuition	Greenwood
Bowie, D. T.	Non-Tuition	Pickens
Bowles, M. G.	Non-Tuition	Greenwood
Bowles, W. A.	Tuition	Richland
Boykin, J. S.	Scholarship	Kershaw
Boseman, A. N.	Tuition	Greenville
Bramlette, J. I.	Scholarship	Greenville
Brandon, J. W.	Tuition	York
Brannon, C. C.	Scholarship	Spartanburg
Breedlove, W.	Non-Tuition	Pickens
Bridge, M. F.	Non-Tuition	Colleton
Briggman, T. E.	Non-Tuition	Orangeburg
Brigman, G. H.	Non-Tuition	Lancaster
Britt, J. B.	Tuition	McCormick
Broadway, G. L.	Non-Tuition	Sumter
Brown, A. E.	Non-Tuition	Union
Brown, C. S.	Non-Tuition	Greenville
Brown, R. L.	Non-Tuition	Florence
Brunson, J. B.	Non-Tuition	Allendale
Bryan, H. G.	Non-Tuition	Allendale
Bryan, H. L.	Tuition	Jacksonville, Fla.
Bryan, W. Z.	Non-Tuition	Allendale
Bryant, E. E.	Non-Tuition	Anderson
Bryson, G. T.	Non-Tuition	Laurens
Burgess, E. A.	Non-Tuition	Anderson
Burgess, E. F.	Non-Tuition	Anderson
Burgess, W. A.	Tuition	Anderson
Burns, C. F.	Non-Tuition	Richland
Burns, F. A.	Scholarship	York
Burns, R. C.	Non-Tuition	Greenville
Burns, W. C.	Non-Tuition	Orangeburg
Burton, W. J.	Tuition	Oconee
Busbee, T. T.	Non-Tuition	Aiken
Byrd, B. W.	Non-Tuition	Darlington
Byrd, C. F.	Tuition	Edgefield
Byrd, H. L.	Non-Tuition	Georgetown
Byrd, H. P.	Non-Tuition	Darlington
Byrd, W. A.	Tuition	Edgefield
Caldwell, J. L.	Non-Tuition	Spartanburg
Caldwell, W. K.	Tuition	Dillon
Calhoun, A. M.	Tuition	Marlboro
Calhoun, P. N.	Tuition	Columbus, Ga.
Cambridge, R. N.	Non-Tuition	Clinton, Mass.
Camp, M. J.	Non-Tuition	Cherokee
Campbell, James A.	Non-Tuition	Georgetown
Campbell, Jack A.	Non-Tuition	Anderson
Campbell, W. G.	Tuition	York
Campbell, W. M.	Non-Tuition	Tirzah
Cannon, A. F.	Non-Tuition	Horry
Cannon, F. W.	Non-Tuition	Anderson
Cannon, H. F.	Scholarship	Anderson
Carey, H. A.	Non-Tuition	Oconee
Carey, J. C.	Non-Tuition	Oconee
Carter, C. W.	Tuition	Oconee
Carter, G. M.	Non-Tuition	Bamberg
Carter, L. J.	Non-Tuition	Horry
Carter, W. J.	Non-Tuition	Darlington

CLASSIFICATION OF STUDENTS AS REGARDS PAYMENT OF TUITION AND HOLDING OF AGRICULTURAL AND TEXTILE SCHOLARSHIPS—(Continued)

Name	Classification	County
Carter, Walter R.	Non-Tuition	Orangeburg
Carter, William, R.	Non-Tuition	Jasper
Casey, J. O.	Non-Tuition	Anderson
Casey, R. B.	Non-Tuition	Anderson
Castillo, R. E.	Tuition	Leon, Nicaragua
Cathcart, J. M.	Tuition	Anderson
Cato, C. P.	Non-Tuition	Chesterfield
Caughman, D. H.	Tuition	Lexington
Caughman, G. W.	Non-Tuition	Lexington
Caughman, J. S.	Tuition	Lexington
Caughman, M. W.	Non-Tuition	Lexington
Causey, E. M.	Non-Tuition	Hampton
Causey, R. F.	Non-Tuition	Hampton
Cave, P. H.	Tuition	Bamberg
Chachere, L. E.	Non-Tuition	Anderson
Chalmers, T. C.	Scholarship	Newberry
Chamblee, J. C.	Non-Tuition	Anderson
Chapman, C. E.	Non-Tuition	Darlington
Chapman, J. E.	Non-Tuition	Anderson
Chapman, J. L.	Non-Tuition	York
Chapman, R. D.	Non-Tuition	Anderson
Chapman, V. G.	Non-Tuition	Anderson
Chappell, P. B.	Non-Tuition	Lee
Chastain, P. G.	Non-Tuition	Greenville
Chavous, C. C.	Non-Tuition	Allendale
Chavous, G. W.	Scholarship	Allendale
Cheatham, C. H.	Scholarship	Florence
Cheatham, W. E.	Tuition	Toccoa, Ga.
Cheatham, W. L.	Non-Tuition	Abbeville
Childers, J. C.	Scholarship	Greenville
Childress, L. E.	Non-Tuition	Greenville
Chipley, W. C.	Non-Tuition	Greenwood
Christopher, P. R.	Non-Tuition	Greenville
Clark, F. J.	Tuition	Anderson
Clark, H. M.	Tuition	Greenwood
Clark, J. W.	Non-Tuition	Greenville
Clarkson, C. A.	Non-Tuition	Kershaw
Clarkson, R. J.	Non-Tuition	Kershaw
Clary, J. E.	Non-Tuition	Richland
Clayton, C. N.	Scholarship	Pickens
Clayton, L. O.	Non-Tuition	Pickens
Clements, J. M.	Tuition	Atlanta, Ga.
Clerc, G. E.	Scholarship	Georgetown
Clifton, F. T.	Scholarship	Florence
Clinton, T. F.	Non-Tuition	York
Cloaninger, B. D.	Scholarship	Richland
Cloaninger, C. E.	Scholarship	Richland
Cloy, R. E.	Non-Tuition	Allendale
Clyde, T. J.	Scholarship	Georgetown
Cobb, D. J.	Non-Tuition	Richland
Cobb, W. C.	Tuition	Pickens
Cochran, F. D.	Scholarship	Greenwood
Cochran, J. H.	Non-Tuition	Abbeville
Cochran, J. W.	Non-Tuition	Oconee
Coe, E. G.	Non-Tuition	Charleston
Coggin, A. B.	Non-Tuition	Spartanburg
Coggins, V. R	Scholarship	Spartanburg
Cole, M. H.	Tuition	Newman, Ga.
Coleman, F. H.	Non-Tuition	Laurens
Coleman, J. D.	Tuition	Union
Coleman, J. K.	Non-Tuition	Fairfield
Coleman, J. R.	Tuition	Florence
Coleman, W. D.	Tuition	Charleston
Coleman, W. W.	Non-Tuition	Florence
Collier, T. W.	Non-Tuition	Orangeburg
Collins, C. J.	Non-Tuition	Spartanburg
Coln, W. A.	Non-Tuition	Chester
Colvin, H. O.	Scholarship	Darlington
Compton, J. B.	Non-Tuition	Union
Connelly, H. P.	Non-Tuition	York
Constan, G. N.	Non-Tuition	Richland
Cook, E. W.	Tuition	Oconee
Cook, J. A.	Non-Tuition	Aiken
Cooper, F. R.	Non Tuition	Greenville
Cooper, R. C.	Tuition	Richland
Copeland, F. P.	Scholarship	Darlington
Copeland, J. E.	Non-Tuition	Florence
Copeland, L. B.	Non-Tuition	Lee
Corley, F. W.	Non-Tuition	McCormick
Corne, T. P.	Tuition	Spartanburg
Courtney, P. L.	Tuition	Aiken
Cousar, H. N.	Non-Tuition	Dillon
Cousar, T. A.	Tuition	Fayetteville, N. C.
Covington, C. F.	Non-Tuition	Spartanburg
Coward, H. C.	Tuition	Aiken
Cowherd, C. P.	Non-Tuition	Orangeburg
Cox, D. M.	Scholarship	Williamsburg
Cox, J. J.	Non-Tuition	Spartanburg
Craft, V. E.	Tuition	Lexington
Craig, J.	Non-Tuition	Pickens
Crain, W. C.	Non-Tuition	Spartanburg
Cranford, M. R.	Tuition	Kings Mt., N. C.
Crawford, A. R.	Non-Tuition	Saluda
Crawford, B. H.	Scholarship	Union
Crawford, H. G.	Non-Tuition	Richland
Crenshaw, H. L.	Non-Tuition	Anderson
Crews, J. F.	Non-Tuition	Hampton
Crook, E. J.	Non-Tuition	York
Crosson, L. H	Tuition	Lexington
Crouch, R. H.	Scholarship	Saluda

CLASSIFICATION OF STUDENTS AS REGARDS PAYMENT OF TUITION AND HOLDING OF AGRICULTURAL AND TEXTILE SCHOLARSHIPS—(Continued)

Name	Classification	County
Crouch, W.	M.—Non-Tuition	Saluda
Crout, A.	R.—Non-Tuition	Lexington
Crout, W.	H.—Non-Tuition	Lexington
Crow, E.	E.—Tuition	Spartanburg
Crum, W.	D.—Non-Tuition	Orangeburg
Crutchfield, C.	E.—Non-Tuition	Orangeburg
Crutchfield G.	F.—Non-Tuition	Orangeburg
Crutchfield W.	G.—Tuition	Spartanburg
Crymes F.	H.—Non-Tuition	Greenwood
Cudd, A.	D.—Tuition	Spartanburg
Cudd, B.	L.—Non-Tuition	Spartanburg
Culley, F.	B.—Tuition	Aiken
Culp, D.	M.—Non-Tuition	Union
Culp, W.	R.—Non-Tuition	Spartanburg
Cummings, C.	E.—Tuition	Lee
Cureton, J.	L.—Tuition	Greenville, Ala.
Curry, J.	A.—Non-Tuition	Laurens
Cuttino, T.	E.—Tuition	Sumter
Dabney, C.	E.—Non-Tuition	York
Dantzler, W.	D.—Non-Tuition	Orangeburg
Dargan, H.	G.—Non-Tuition	Darlington
Dargan, J.	P.—Non-Tuition	Darlington
Dargan, W.	E.—Scholarship	Darlington
Dashiell, T.	I.—Non-Tuition	Greenville
Davenport, P.	J.—Non-Tuition	Aiken
David, A.	J.—Non-Tuition	Marlboro
Davis, B.	W.—Tuition	Charleston
Davis C.	A.—Non-Tuition	Greenwood
Davis, D.	P.—Scholarship	Chester
Davis, J.	H.—Non-Tuition	Chesterfield
Davis, J.	M.—Non-Tuition	Lancaster
Davis, J.	S.—Non-Tuition	Oconee
Davis, J.	W.—Tuition	Smyrna, Ga.
Davis, R.	L.—Tuition	Darlington
Davis, W.	D.—Tuition	Toccoa, Ga.
Dawsey, C.	B.—Non-Tuition	Horry
Day, J.	B.—Non-Tuition	Spartanburg
Day, W.	G.—Tuition	Spartanburg
Deadwyler, G.	B.—Non-Tuition	Greenwood
Dean, J.	H.—Scholarship	Greenwood
Deason, S.	K.—Non-Tuition	Barnwell
Decker, J.	B.—Tuition	Cumberland, Md.
Delk, L.	—Scholarship	Greenville
DeMers, C.	J.—Tuition	Anderson
Densler, C.	M.—Non-Tuition	Charleston
DePass, W.	B.—Tuition	Greenwood
Derrick, W.	E.—Non-Tuition	Edgefield
DeWitt, W.	C.—Non-Tuition	Darlington
Dickson, A.	A.—Tuition	Richland
Dickson, W.	W.—Non-Tuition	Clarendon
Dill, H.	W.—Non-Tuition	Greenville
Dill, P.	V. B.—Non-Tuition	Spartanburg
Dobey, J.	N.—Non-Tuition	Edgefield
Dobson, L.	A.—Tuition	Spartanburg
Dobson, L.	M.—Tuition	Spartanburg
Dominick, C.	B.—Non-Tuition	Greenwood
Dorn, G.	B.—Non-Tuition	Greenwood
Dorn, P.	C.—Non-Tuition	McCormick
Douglass, G.	A.—Non-Tuition	Abbeville
Dove, J.	C.—Non-Tuition	Williamsburg
Dowdle, H.	J.—Scholarship	York
Dozier, G.	L.—Non-Tuition	Spartanburg
Dozier, W.	C.—Non-Tuition	Marion
Drennan, L.	W.—Scholarship	McCormick
DuBose, J.	R.—Tuition	Aiken
DuBose, T.	S.—Tuition	Sumter
Dunbar, C.	L.—Non-Tuition	Allendale
Duncan, F.	Y.—Non-Tuition	York
Duncan, W.	—Non-Tuition	York
Duncan, W.	T.—Tuition	Clayton, Ga.
Dunlap, M.	B.—Non-Tuition	York
Dunlap, W.	M.—Tuition	York
Dunn, W.	E.—Non-Tuition	Newberry
DuRant, C.	—Non-Tuition	Clarendon
DuRant, W.	E.—Non-Tuition	Sumter
Durst, J.	K.—Non-Tuition	Greenwood
Dyess, A.	J.—Non-Tuition	Aiken
Earnhardt, C.	F.—Tuition	Spartanburg
Easterling, D.	L.—Tuition	Marlboro
Eaton, R.	B.—Tuition	Oconee
Edwards, F.	W.—Non-Tuition	Greenville
Edwards, G.	L.—Non-Tuition	Darlington
Edwards, R.	C.—Schoarlship	Laurens
Elias, G.	E.—Non-Tuition	Spartanburg
Ellerbe, C.	M.—Scholarship	Lee
Ellerbe, S.	E.—Non-Tuition	Berkeley
Elliott, J.	B.—Tuition	York
Ellis, J.	R.—Scholarship	Chester
Ellis, T.	E.—Non-Tuition	Abbeville
Ellis, W.	K.—Tuition	Greenwood
Elmer, W.	W.—Tuition	Greenwood
Elmore, G.	T.—Tuition	Cherokee
Entrekin, W.	G.—Scholarship	Pickens
Epting, E.	E.—Scholarship	Newberry
Epting, G.	H.—Non-Tuition	Newberry
Estes, W.	M.—Tuition	Fairfield
Evans, C.	M.—Tuition	Florence
Evans, J.	D.—Tuition	Beaufort
Evans, M.	B.—Non-Tuition	Beaufort
Ewing, J.	E.—Non-Tuition	Pickens

CLASSIFICATION OF STUDENTS AS REGARDS PAYMENT OF TUITION AND HOLDING OF AGRICULTURAL AND TEXTILE SCHOLARSHIPS—(Continued)

Name	Classification	County
Ezell, W.	W.—Non-Tuition	Spartanburg
Fagan, J.	E.—Non-Tuition	Spartanburg
Fagg, T.	H.—Scholarship	Anderson
Faile, K.	L.—Non-Tuition	Lancaster
Farish, C.	A.—Non-Tuition	Cherokee
Fellers, H.	N.—Non-Tuition	Newberry
Fellers, L.	C.—Non-Tuition	Newberry
Ferguson, H.	M.—Non-Tuition	York
Ferguson, J.	A.—Non-Tuition	York
Ferguson, J.	G.—Non-Tuition	York
Finley, W.	H.—Scholarship	Laurens
Fisher, A.	G.—Tuition	Richland
Flagg, N.	B.—Tuition	Lake Wales. Fla.
Fleming, L.	B.—Non-Tuition	Jasper
Fleming, V.	R.—Non-Tuition	Laurens
Fleming, W.	H.—Non-Tuition	Laurens
Floyd, C.	—Non-Tuition	Greenville
Floyd, D.	B.—Tuition	Florence
Fogle, G.	E.—Tuition	Orangeburg
Fogle, H.	W.—Scholarship	Bamberg
Folk, H.	D.—Tuition	Orangeburg
Folk, W.	—Tuition	Berkeley
Folsom, W.	F.—Non-Tuition	Darlington
Folsom, W.	H.—Non-Tuition	Lee
Forb, N.	J.—Non-Tuition	Saluda
Fordham, A.	D.—Scholarship	Beaufort
Forrest, B.	H.—Non-Tuition	Saluda
Foster, J.	L. O.—Non-Tuition	Spartanburg
Foster, L.	W.—Tuition	Spartanburg
Foster, M.	A.—Tuition	Spartanburg
Fowler, A.	C.—Non-Tuition	Greenville
Franklin, B.	—Tuition	Greenwood
Frazier, H.	L.—Tuition	Orangeburg
Free, D.	A.—Non-Tuition	Union
Freeman, J.	—Tuition	Greenville
Freeman, V.	—Non-Tuition	Pickens
French, R.	—Tuition	Augusta, Ga.
Frey, G.	N.—Non-Tuition	Spartanburg
Friday, W.	W.—Scholarship	Greenwood
Fuller, H.	H.—Tuition	Gainesville, Ga.
Fulmer, J.	L.—Scholarship	Newberry
Gable, J.	D.—Tuition	Clarendon
Gaddy, W.	L.—Tuition	Dillon
Gaines, L.	C.—Non-Tuition	Anderson
Galloway, H.	F.—Non-Tuition	Darlington
Galphin, S.	P.—Non-Tuition	Orangeburg
Gandy, E.	D.—Non-Tuition	Georgetown
Gantt, W.	D.—Non-Tuition	Pickens
Garler, M.	I.—Scholarship	Barnwell
Garrison, O.	B.—Scholarship	Bamberg
Gassaway, J.	E.—Non-Tuition	Anderson
Gaston, W.	L.—Tuition	Laurens
Greer, J.	S.—Tuition	Greenville
Geraty, J.	R.—Non-Tuition	Charleston
Gettys, J.	L.—Non-Tuition	Kershaw
Gettys, W.	A.—Tuition	Cherokee
Gibbs, J.	G.—Tuition	Charleston
Gibert, J.	B.—Scholarship	Abbeville
Gibson, B.	D.—Non-Tuition	Chester
Gibson, H.	H.—Non-Tuition	Spartanburg
Gibson, J.	D.—Non-Tuition	Greenville
Gilbert, F.	J.—Scholarship	Spartanburg
Gilland, W.	F.—Non-Tuition	Williamsburg
Gilmer, E.	D.—Non-Tuition	Greenville
Gilreath, H.	J.—Tuition	Greenville
Gilreath, R.	L.—Tuition	Greenville
Gist, W.	H.—Non-Tuition	Union
Gladden, E.	T.—Non-Tuition	Chester
Glass, A.	W. D.—Tuition	Madison, Fla.
Glenn, M.	B.—Non-Tuition	Anderson
Glymph, L.	M.—Non-Tuition	Oconee
Goddard, E.	C.—Non-Tuition	Greenville
Goff, A.	T.—Scholarship	Saluda
Goff, J.	T.—Non-Tuition	Saluda
Goodale, B.	G.—Tuition	Tampa, Fla.
Goodman, W.	P.—Tuition	York
Goodson, J.	W.—Non-Tuition	Darlington
Goodwin, H.	P.—Non-Tuition	Union
Gore, W.	E.—Non-Tuition	Horry
Grainger, A.	D.—Non-Tuition	Horry
Gramling, B.	E.—Tuition	Spartanburg
Gramling, O.	S.—Tuition	Orangeburg
Grant, W.	C.—Non-Tuition	Chester
Graves, J.	H.—Non-Tuition	Abbeville
Gray, F.	M.—Scholarship	Hampton
Gray, N.	N.—Non-Tuition	Laurens
Green, C.	G.—Non-Tuition	Oconee
Green, F.	E.—Tuition	Anderson
Green, F.	L.—Scholarship	Lee
Green, J.	L.—Tuition	Anderson
Green, O.	H.—Tuition	Spartanburg
Greene, R.	J.—Tuition	Orangeburg
Greene, Wallace	P.—Non-Tuition	Oconee
Greene, William	P.—Tuition	Darlington
Greer, L.	E.—Non-Tuition	Greenville
Gresham, E.	W.—Non-Tuition	Greenville
Gresham, M.	L.—Tuition	Greenville
Grey, R.	C.—Non-Tuition	York

CLASSIFICATION OF STUDENTS AS REGARDS PAYMENT OF TUITION AND HOLDING OF AGRICULTURAL AND TEXTILE SCHOLARSHIPS—(Continued)

Name	Classification	County
Griffin, H.	D.—Non-Tuition	Richland
Griffis, D.	P.—Scholarship	Edgefield
Griffith, T.	H.—Non-Tuition	Orangeburg
Grimball, P.	C.—Non-Tuition	Charleston
Griner, J.	F.—Non-Tuition	Charleston
Guill, J.	E.—Tuition	Flat Rock, N. C.
Gunter, R.	E.—Tuition	Aiken
Guthrie, G.	P.—Non-Tuition	Kershaw
Guy, J.	L.—Non-Tuition	Richland
Guy, R.	C.—Tuition	Chester
Hagen, J.	W.—Non-Tuition	Abbeville
Hagood, G.	B.—Non-Tuition	Fairfield
Haigler, H.	D.—Non-Tuition	Barnwell
Haile, F.	L.—Non-Tuition	Union
Haile, J.	—Non-Tuition	Lancaster
Hall, M.	L.—Scholarship	Dillon
Halsey, M.	B.—Tuition	Charleston
Ham, T.	H.—Non-Tuition	Darlington
Hambright, F.	R.—Tuition	Grover, N. C.
Hamer, M.	J.—Non-Tuition	Marlboro
Hamer, R.	P.—Non-Tuition	Florence
Hamilton, A.	R.—Non-Tuition	Pickens
Hamilton, C.	P.—Non-Tuition	Horry
Hamilton, G.	M.—Non-Tuition	York
Hamilton, T.	—Tuition	Clearwater, Fla.
Hammond, F.	H.—Non-Tuition	Pickens
Hane, J.	K.—Non-Tuition	Calhoun
Hankinson, J.	E.—Non-Tuition	Aiken
Hanna, W.	J.—Scholarship	Cherokee
Harley, F.	L.—Scholarship	Orangeburg
Harllee, H.	T.—Non-Tuition	Florence
Harman, G.	L.—Scholarship	Lexington
Harrell, C.	W.—Non-Tuition	Richland
Harrell, D.	C.—Scholarship	Florence
Harrelson, R.	—Tuition	Tabor, N. C.
Harry, C.	F.—Tuition	Grover, N. C.
Hart, J.	L.—Non-Tuition	Spartanburg
Hart, L.	—Non-Tuition	Greenville
Hartley, E.	L.—Tuition	Lexington
Harvin, L.	C.—Non-Tuition	Clarendon
Harvin, L.	H.—Tuition	Clarendon
Harvley, H.	C.—Tuition	Greenville
Harvley, J.	C.—Tuition	Greenville
Haselden, B.	F.—Non-Tuition	Williamsburg
Hawkins, A.	H.—Non-Tuition	Greenville
Hawkins, H.	J.—Non-Tuition	Greenville
Hayes, R.	A.—Non-Tuition	Anderson
Hays, G.	L.—Non-Tuition	Anderson
Heinemann, J.	C.—Non-Tuition	Bamberg
Hembree, E.	E.—Tuition	Charleston
Henderson, T.	W.—Non-Tuition	Greenwood
Hendricks, L.	E.—Tuition	Pickens
Henley, C.	M.—Non-Tuition	Dorchester
Henley, J.	W.—Non-Tuition	Dorchester
Herbert, J.	T.—Non-Tuition	Saluda
Herlong, H.	M.—Non-Tuition	Edgefield
Herndon, J.	R.—Tuition	Toccoa, Ga.
Heron, H.	H.—Non-Tuition	Fairfield
Hetrick, J.	P.—Non-Tuition	Oconee
Hewitt, T.	H.—Non-Tuition	Florence
Hicks, H.	B.—Non-Tuition	Cherokee
Hicks, W.	L.—Non-Tuition	Greenville
Hill, D.	M.—Tuition	Spartanburg
Hill, F.	—Tuition	Greenville
Hill, H.	C.—Non-Tuition	Greenville
Hill, H.	G.—Non-Tuition	Sumter
Hills, G.	W.—Non-Tuition	Charleston
Hills, J.	T.—Non-Tuition	Charleston
Hindman, R.	E.—Tuition	Richland
Hinton, C.	N.—Non-Tuition	Pickens
Hodge, W.	D.—Non-Tuition	Clarendon
Hoefer, C.	B.—Tuition	Richland
Hoffman, G.	C.—Non-Tuition	Bamberg
Hoffman, H.	C.—Scholarship	Richland
Hoffman, J.	L.—Scholarship	Bamberg
Hogarth, C.	P.—Non-Tuition	Hampton
Holder, W.	S.—Scholarship	Chester
Holland, R.	B.—Non-Tuition	Oconee
Hollingsworth, E.	W.—Tuition	Greenwood
Holman, R.	E.—Non-Tuition	Florence
Holstein, R.	H.—Non-Tuition	Saluda
Holt, R.	A.—Non-Tuition	Horry
Hook, F.	W.—Non-Tuition	Sumter
Hoover, H.	O.—Tuition	Orangeburg
Hope, J.	K.—Non-Tuition	York
Hope, T.	G.—Tuition	Gastonia, N. C.
Hopkins, C.	D.—Non-Tuition	Orangeburg
Horry, H.	H.—Scholarship	Jasper
Hough, A.	M.—Non-Tuition	Lancaster
Horton, S.	F.—Non-Tuition	Chesterfield
Hough, W.	B.—Non-Tuition	Kershaw
Howard, A.	D.—Tuition	Columbus, Ga.
Howard, E.	G.—Non-Tuition	Greenville
Howard, H.	C.—Tuition	Aiken
Howell, E.	L.—Non-Tuition	Georgetown
Howle, E.	S.—Tuition	Darlington
Howle, W.	M.—Scholarship	Darlington
Howze, J.	C.—Tuition	Chester

CLASSIFICATION OF STUDENTS AS REGARDS PAYMENT OF TUITION AND HOLDING OF AGRICULTURAL AND TEXTILE SCHOLARSHIPS—(Continued)

Name	Classification	County
Howze, W. K.	Non-Tuition	Richland
Hoyt, L. R.	Non-Tuition	Sumter
Huckabee, M. L.	Scholarship	Marion
Hudgens, D. C.	Non-Tuition	Pickens
Huff, J. C.	Non-Tuition	Greenville
Hughes, J. H.	Non-Tuition	Spartanburg
Hughes, R. H.	Non-Tuition	Spartanburg
Hughes, W.	Tuition	Pikeville, Ky.
Hughston, P. D.	Tuition	Spartanburg
Hunt, H. A.	Tuition	Oconee
Hunt, J. B.	Non-Tuition	Newberry
Hunt, T. C.	Non-Tuition	Oconee
Hunter, H. L.	Tuition	Oconee
Hunter, J. E.	Tuition	Pickens
Hunter, W. H.	Non-Tuition	Anderson
Hunter, W. P.	Scholarship	Laurens
Huskey, O. R.	Non-Tuition	Spartanburg
Hutcheson, E. M.	Tuition	Oconee
Hutcheson, J. R.	Non-Tuition	Greenville
Hutcheson, W. B.	Tuition	Oconee
Hutchinson, W.	Tuition	Oconee
Hux, C. E.	Non-Tuition	Horry
Hyde, S.	Non-Tuition	Charleston
Iler, F. R.	Tuition	Greenville
Ingalls, W. B.	Tuition	Scotia, N. Y.
Jackson, A. E.	Scholarship	Florence
Jackson, F. C.	Tuition	Torrington, Conn.
Jackson, F. J.	Scholarship	Spartanburg
Jackson, J. H.	Non-Tuition	Sumter
Jackson, O. W.	Non-Tuition	Orangeburg
Jackson, T. H.	Non-Tuition	Florence
Jacobs, L. T.	Non-Tuition	Williamsburg
Jacobs, W. L.	Tuition	St. Louis, Mo.
James, J. F.	Tuition	Sumter
Jarrard, C. E.	Non-Tuition	Greenville
Jefferies, J. E.	Non-Tuition	Cherokee
Jenkins, H. N.	Scholarship	Barnwell
Jenkins, R. F.	Non-Tuition	York
Jeter, D. G.	Non-Tuition	Fairfield
Jett, L. E.	Non-Tuition	Union
Johnson, G. T.	Non-Tuition	Aiken
Johnson, J. B.	Non-Tuition	York
Johnson, N. Y.	Tuition	Newberry
Johnstone, A. M.	Non-Tuition	Newberry
Johnstone, F. E.	Tuition	Georgetown
Jones, C. M.	Scholarship	Colleton
Jones, G. C.	Non-Tuition	Oconee
Jones, H. B.	Tuition	Greenville
Jones, J. E.	Non-Tuition	York
Jones, R. A.	Scholarship	Newberry
Jones, Randolph M.	Scholarship	Beaufort
Jones, Robert Maurice	Non-Tuition	Colleton
Jones, Robert Morgan	Non-Tuition	Anderson
Jordan, W. H.	Scholarship	Horry
Jordan, W. K.	Non-Tuition	Florence
Joye, J. D.	Non-Tuition	Darlington
Justus, J. H.	Non-Tuition	Spartanburg
Karelitz, M. H.	Tuition	Greenville
Kay, W. P.	Non-Tuition	Anderson
Kearse, H. H.	Tuition	Bamberg
Keller, W. B.	Non-Tuition	Pickens
Kelley, W. C.	Non-Tuition	Pickens
Kelly, E. R.	Scholarship	Florence
Kelly, M. E.	Non-Tuition	Pickens
Kennemur, D. H.	Non-Tuition	Pickens
Kent, A. P.	Tuition	Bloomfield, N. J.
Kilpatrick, J. B.	Scholarship	Oconee
Kinard, D. T.	Non-Tuition	Greenwood
King, E. H.	Tuition	Marion
King, R. L.	Non-Tution	Abbeville
King, W. W.	Non-Tuition	Charleston
Kinghorn, J. A.	Tuition	Beaufort
Kinghorn, J. B.	Tuition	Beaufort
Kinsler, M. E.	Tuition	Pickens
Kirchner, G. F.	Non-Tuition	Greenville
Kirkpatrick, D. A.	Non-Tuition	Chester
Kitchens, C. W.	Non-Tuition	Laurens
Kittles, W. H.	Non-Tuition	Fairfield
Kizer, H. J.	Non-Tuition	Dorchester
Kizer, W. P.	Non-Tuition	Orangeburg
Kluttz, W. B.	Tuition	Chester
Kneece, H. E.	Non-Tuition	Aiken
Knight, F. A.	Tuition	Chesterfield
Knight, S. B.	Tuition	Asheville, N. C.
Knigoff, M.	Tuition	Greenville
Kohn, D.	Tuition	Greenville
Koon, A. W.	Non-Tuition	Richland
Kuykendal, C. M.	Non-Tuition	York
LaBruce, L. P.	Tuition	Georgetown
Lacey, C. E.	Scholarship	Charleston
LaGrone, J. W.	Non-Tuition	Saluda
Laubert, J. M.	Non-Tuition	Florence
Lancaster, J. A.	Non-Tuition	Spartanburg
Laney, S. L.	Tuition	Lee
Lanford, J. L.	Non-Tuition	Spartanburg
Langford, F. T.	Non-Tuition	Richland
Langley, A. A.	Scholarship	McCormick
Langston, E. P.	Scholarship	Darlington

CLASSIFICATION OF STUDENTS AS REGARDS PAYMENT OF TUITION AND HOLDING OF AGRICULTURAL AND TEXTILE SCHOLARSHIPS—(Continued)

Name	Classification	County
Lanham, H. M.	Non-Tuition	Spartanburg
Latham, B. M.	Scholarship	York
Latham, E. E.	Non-Tuition	York
Latimer, P. H.	Tuition	Brunswick, Ga.
Latimer, W. M.	Non-Tuition	Anderson
Lawlor, W. K.	Tuition	Balboa Heights, Canal Zone
Lawrence, B. R.	Tuition	Oconee
Lawrence, J.	Non-Tuition	Greenwood
Lawton, E. G.	Tuition	Thacker, W. Va.
Lawton, F. A.	Tuition	Thacker, W. Va.
Layton, C. V.	Non-Tuition	Spartanburg
Lazenby, W. C	Tuition	York
League, J. B	Non-Tuition	Greenville
Lee, D. D.	Tuition	Dillon
Lee, F. W.	Non-Tuition	Spartanburg
Lee, G. W.	Non-Tuition	Orangeburg
Lee, J. D.	Non-Tuition	Orangeburg
Lee, O. A.	Non-Tuition	Richland
Leister, D. M.	Tuition	Oconee
LeMaster, G. W.	Tuition	Cherokee
Leonard, D. O.	Tuition	Spartanburg
Leslie, E. E.	Scholarship	York
Leverette, W. L.	Non-Tuition	Richland
Lewis, J. H.	Tuition	Estherwood, La.
Lewis, O. C.	Non-Tuition	Horry
Lide, T. N.	Non-Tuition	Anderson
Lightsey, E. O.	Tuition	Hampton
Lindler, W.	Scholarship	Saluda
Lindsay, R. H.	Non-Tuition	Anderson
Lineberger, J. M.	Tuition	Greenville
Lingle, E. C.	Tuition	Sumter
Lingle, W. A.	Tuition	Sumter
Lipscomb, W. E.	Non-Tuition	Cherokee
Littlejohn, B. R.	Tuition	Anderson
Littlejohn, J. P.	Tuition	Oconee
Littlejohn, T. F.	Non-Tuition	Union
Livingston, L. A	Scholarship	Orangeburg
Livingston, T. F.	Non-Tuition	Aiken
Lloyd, O. W.	Non-Tuition	Darlington
Lofton, S. J.	Non-Tuition	Charleston
Logue, J. F.	Non-Tuition	Edgefield
Long, E.	Scholarship	Anderson
Long, H. L	Non-Tuition	York
Long, J. A.	Non-Tuition	Saluda
Long, M. C.	Non-Tuition	Oconee
Long, M. L.	Non-Tuition	Saluda
Long, R. F.	Non-Tuition	Fairfield
Long, V. A.	Non-Tuition	Newberry
Love, J. F.	Non-Tuition	York
Lowry, P A.	Tuition	Richland
Lowry, S. E.	Non-Tuition	Oconee
Lupo, J. W.	Non-Tuition	Dillon
Lupo, W. E.	Tuition	Dillon
Lyles, W. G.	Non-Tuition	Newberry
Lyman, E. H.	Tuition	Sumter
Lynch, C. W.	Tuition	Florence
Lynch, T. L.	Non-Tuition	Pickens
Lynes, O. B.	Tuition	Allendale
Lynn, J. C.	Non-Tuition	Greenville
Lynn, W. G.	Non-Tuition	Greenville
Lytle, C. A.	Tuition	York
McAlister, H. J.	Scholarship	Anderson
McAlister, J. M.	Tuition	Anderson
McCall, A. E.	Non-Tuition	Lee
McCalla, J. W.	Tuition	Middleton, Ga.
McCarter, J. W.	Non-Tuition	Spartanburg
McCollough, F. E.	Tuition	Alexander City, Ala.
McCollum, H. A.	Non-Tuition	Marlboro
McCowan, C.	Non-Tuition	Darlington
McCowan, J. J.	Scholarship	Florence
McCoy, F. G.	Tuition	Aiken
McCravy, W. L.	Non-Tuition	Laurens
McCreight, D. W.	Non-Tuition	Chesterfield
McCully, J. C.	Non-Tuition	York
McCutchen, J.	Non-Tuition	Union
McDaniel, H. D.	Non-Tuition	Laurens
McDaniel, O. H.	Non-Tuition	Charleston
McDonald, H. L.	Non-Tuition	Anderson
McDowell, S. T.	Non-Tuition	York
McElveen, J. H.	Non-Tuition	Florence
McGee, R. H.	Non-Tuition	Anderson
McGee, R. L.	Non-Tuition	Anderson
McGee, W. H.	Tuition	Anderson
McGowan, C. C.	Non-Tuition	Greenville
McGrew, G. E.	Scholarship	Sumter
McIver, E. R.	Tuition	Florence
McKain, L. N.	Non-Tuition	Florence
McKeller, T. P.	Non-Tuition	Greenwood
McKenzie, G. S.	Non-Tuition	Marion
McKerley, J. A.	Non-Tuition	Barnwell
McKibben, H. A.	Non-Tuition	York
McKinney, J. T.	Tuition	Pickens
McLaurin, C. L.	Non-Tuition	Richland
McLaurin, H. M.	Tuition	Sumter
McLaurin, J. N.	Non-Tuition	Kershaw

CLASSIFICATION OF STUDENTS AS REGARDS PAYMENT OF TUITION AND HOLDING OF AGRICULTURAL AND TEXTILE SCHOLARSHIPS—(Continued)

Name	Classification	County
McLaurin, J. W.	Tuition	Marlboro
McLees, W. H.	Non-Tuition	Oconee
McLeod, J. A.	Non-Tuition	Dillon
McMeekin, J. G.	Non-Tuition	Fairfield
McMeekin, M. P.	Non-Tuition	Fairfield
McMeekin, T. G.	Tuition	Fairfield
McMillan, O.	Scholarship	Saluda
McMillin, C. C.	Tuition	Spartanburg
McNab, J. R.	Non-Tuition	Barnwell
McNinch, J. B.	Scholarship	Greenwood
McRae, A. C.	Non-Tuition	Marlboro
McSwain, G. R.	Tuition	Cherokee
Mack, J. L.	Scholarship	Calhoun
McMillan, C. F.	Tuition	Charleston
Maddox, C. F.	Non-Tuition	Richland
Maddox, E. R.	Scholarship	Kershaw
Mahaffey, C. R.	Non-Tuition	Greenville
Mahaffey, H. T.	Non-Tuition	Lancaster
Major, E. M.	Non-Tuition	Anderson
Mann, J. M.	Tuition	Greenville
Mann, J. Mundy	Tuition	LaGrange, Ga.
Manning, W. R.	Non-Tuition	Anderson
Mansfield, E. R.	Tuition	Spartanburg
Marett, E. C.	Non-Tuition	Oconee
Martin, B. C.	Non-Tuition	Laurens
Martin, B. F.	Tuition	Greenville
Martin, B. R.	Tuition	Grosse Pointe, Mich.
Martin, F. D.	Scholarship	Greenville
Martin, F. H.	Non-Tuition	Greenville
Martin, H. D.	Non-Tuition	Greenville
Martin, H. W.	Non-Tuition	Anderson
Martin, J. E.	Non-Tuition	Anderson
Martin, J. S.	Non-Tuition	Fairfield
Martin, W. B.	Non-Tuition	Greenville
Martin, W. J.	Scholarship	Greenwood
Martin, W. P.	Non-Tuition	Abbeville
Mason, E. R.	Tuition	Greenwood
Mason, J. E.	Non-Tuition	Anderson
Mason, M. C.	Non-Tuition	Kershaw
Matthews, T. G.	Tuition	Saluda
Mauldin, W. O.	Non-Tuition	Pickens
Mayfield, L. H.	Non-Tuition	Spartanburg
Mayfield, W. D.	Non-Tuition	Greenville
Mays, A. R.	Tuition	Canadian, Texas
Medlin, W. A.	Tuition	Florence
Medlin, W. H.	Tuition	Marlboro
Merritt, S. L.	Non-Tuition	York
Metts, W. D.	Tuition	Greenville
Middleton, R. H.	Non-Tuition	McCormick
Mikell, W. H.	Tuition	Charleston
Milam, W. N.	Non-Tuition	Greenwood
Miley, J. P.	Non-Tuition	Hampton
Miley, R. V.	Non-Tuition	Hampton
Miller, E. N.	Non-Tuition	York
Miller, G. F.	Tuition	Helen, Ga.
Miller, J. D.	Non-Tuition	Union
Miller, J. W.	Non-Tuition	Orangeburg
Miller, John W.	Non-Tuition	York
Miller, M. G.	Non-Tuition	Abbeville
Miller, M. H.	Tuition	Jasper
Miller, R. T.	Tuition	Tampa, Fla.
Mills, J. A.	Tuition	Sumter
Mitchell, J. H.	Tuition	Pickens
Mitchell, J. M.	Non-Tuition	Lexington
Mitchell, M. F.	Tuition	Anderson
Mobley, G. J.	Non-Tuition	Lancaster
Moise, E. W.	Tuition	Sumter
Moise, S. L.	Tuition	Sumter
Montgomery, H. S.	Non-Tuition	Williamsburg
Montgomery, L. K.	Tuition	Williamsburg
Monts, W. L.	Non-Tuition	Richland
Moody, R. E.	Non-Tuition	Greenville
Moon, D. S.	Tuition	Oconee
Mooneyhan, C. G.	Non-Tuition	Lee
Moore, A. T.	Scholarship	Richland
Moore, E. C.	Scholarship	Sumter
Moore, F. B.	Tuition	Marlboro
Moore, J. B.	Tuition	Anderson
Moore, J. L.	Non-Tuition	Marlboro
Moore, John F.	Non-Tuition	Horry
Moore, Joe P.	Non-Tuition	York
Moore, J. S.	Non-Tuition	York
Moore, T. G.	Tuition	Greenwood
Moore, T. T.	Scholarship	Richland
Morris, E. L.	Tuition	Washington, D. C.
Morris, J. W.	Non-Tuition	Oconee
Morris, R. H.	Non-Tuition	Florence
Morris, W. B.	Tuition	Gastonia, N. C.
Morrison, A.	Non-Tuition	Anderson
Moseleyn, V.	Tuition	Orangeburg
Moss, C. S.	Non-Tuition	Spartanburg
Moss, J. R.	Non-Tuition	York
Moss, W. D.	Non-Tuition	Oconee
Motes, P. M.	Scholarship	Laurens
Mouchet, J. R.	Non-Tuition	Anderson
Mozingo, J. P.	Non-Tuition	Darlington
Muller, J. H.	Tuition	Charleston

CLASSIFICATION OF STUDENTS AS REGARDS PAYMENT OF TUITION AND HOLDING OF AGRICULTURAL AND TEXTILE SCHOLARSHIPS—(Continued)

Name	Classification	County
Mullikin, T. S.	Non-Tuition	Anderson
Mundy, J. W.	Tuition	Edgefield
Munn, J. M.	Tuition	Folrence
Munn, S. B.	Non-Tuition	Kershaw
Murph, W. S.	Tuition	Greenwood
Murphree, J. H.	Non-Tuition	Pickens
Murphy, S. A.	Non-Tuition	Anderson
Murphy, T. F.	Scholarship	Charleston
Murray, J. G.	Tuition	Charleston
Myers, T. R.	Tuition	Hartwell, Ga.
Nalley. C. D.	Non-Tuition	Pickens
Nalley, R. L.	Scholarship	Florence
Nance, J. H.	Tuition	Laurens
Nash, H. O.	Tuition	Charleston
Nash, J. R.	Non-Tuition	Greenville
Nathan, H. H.	Scholarship	Charleston
Nathans, J. N.	Tuition	Charleston
Neely, T. W.	Non-Tuition	York
Neely, W. G.	Scholarship	York
Neely, W. J.	Non-Tuition	York
Nesbit, S. L.	Non-Tuition	Spartanburg
Nettles, J. S.	Tuition	Kershaw
Neuffer, C. H.	Non-Tuition	Abbeville
Newbury, E. A.	Non-Tuition	Spartanburg
Newman, J. B.	Scholarship	Sumter
Newman, J. W.	Non-Tuition	Pickens
Newsom, S. M.	Tuition	Jacksonville. Fla.
Newsom, S. T.	Tuition	LaGrange, Ga.
Nivens, H. B.	Tuition	York
Nix, R. O.	Tuition	Anderson
Nolon, M. P.	Scholarship	Marlboro
Norris, P. T.	Non-Tuition	Greenville
Norton, D. B.	Non-Tuition	Malboro
Nuessner, K. E.	Scholarship	Greenville
Oates, R. M.	Scholarship	York
O'Cain, M. C.	Non-Tuition	Orangeburg
O'Dell, H. H.	Tuition	Chicago, Ill.
O'Dell, T. B.	Non-Tuition	Laurens
Orr. H. F.	Non-Tuition	Anderson
Orr, J .L.	Tuition	Anderson
Osteen, A. D.	Tuition	Anderson
Owen, R. A.	Tuition	Orangeburg
Owen, R. S.	Schoarship	Orangeburg
Owens, M. B.	Non-Tuition	Charleston
Owings, H. R.	Non-Tuition	Laurens
Face, C. M.	Tution	Spartanburg
Padgett, E. E.	Scholarship	Saluda
Padgett, G. D.	Non-Tuition	Colleton
Padgett, W. H.	Non-Tuition	Colleton
Padgett, W. N.	Scholarship	Saluda
Palmer, C. L.	Non-Tuition	Pickens
Palmer R. F.	Scholarshp	Greenwood
Parker, E. C.	Non-Tuition	Greenville
Parker, I. S.	Non-Tuition	Sumter
Parkins, R. A.	Non-Tuition	Greenville
Parkman, L. M.	Non-Tuition	Greenwood
Parks, F. L.	Scholarship	Charleston
Parks, N. C.	Non-Tuition	Marlboro
Parrott, J. L.	Non-Tuition	Pickens
Parrott, P. M.	Tuition	Sumter
Patrick, J. C.	Non-Tuition	Fairfield
Patterson, E. R.	Non-Tuition	Richland
Patterson, J. L.	Non-Tution	York
Patterson, S. R.	Tuition	Oconee
Patterson. W. J.	Non-Tuition	Greenwood
Paulling, J. M.	Non-Tuition	Calhoun
Pearson, W. B.	Non-Tuition	Fairfield
Perry. W. B.	Scholarship	Pickens
Pettus, W. S.	Non-Tuition	York
Phillips, J. R.	Tuition	Gadsden, Ala.
Phillips, C. R.	Tuition	Columbus, Ga.
Phillips, P. C.	Non-Tuition	Charleston
Pickens, B. R.	Tuition	Spartanburg
Pickens, T. R.	Non-Tuition	Pickens
Pinckney, B. D.	Non-Tuition	Beaufort
Pitts, S. H.	Non-Tuition	Saluda
Plowden, C. N.	Tuition	Clarendon
Poag, J. C.	Tuition	Lancaster
Poag, J. R.	Non-Tuition	York
Pollard, F. B.	Non-Tuition	Greenville
Price, G. W.	Tuition	Colleton
Prickett, F. L.	Non-Tuition	Calhoun
Priester, A. U.	Non-Tuition	Oconee
Pritcher, O. E.	Non-Tuition	Orangeburg
Proctor, L. K.	Non-Tuition	Cherokee
Pruitt, J. C.	Non-Tuition	Anderson
Pugh, G. J.	Non-Tuition	Newberry
Pursley, W. E.	Non-Tuition	York
Quattlebaum, A. M.	Tuition	Edgefield
Quattlebaum, P.	Tuition	Horry
Ragsdale, C. H.	Non-Tuition	Fairfield
Rainey, H. B.	Non-Tuition	Spartanburg
Rainey, W. P.	Non-Tuition	Spartanburg
Raley, L. E.	Scholarship	Chesterfield
Rambo, B. P.	Non-Tuition	Greenwood
Ramey, A. T.	Non-Tuition	Abbeville
Ramey, E. D.	Non-Tuition	Greenville
Ramseur, A. R.	Non-Tuition	Oconee

CLASSIFICATION OF STUDENTS AS REGARDS PAYMENT OF TUITION AND HOLDING OF AGRICULTURAL AND TEXTILE SCHOLARSHIPS—(Continued)

Name	Classification	County
Rast, R. E.	Non-Tuition	Orangeburg
Rawlinson, O. H.	Tuition	Clarendon
Ready, E. L.	Tuition	Saluda
Reames, R. C.	Tuition	Lee
Redwine, L. W.	Non-Tuition	Spartanburg
Reeves, E. B.	Non-Tuition	Charleston
Reeves, W. A.	Tuition	LaGrange, Ga.
Reid, W. L.	Non-Tuition	Fairfield
Rentz, C. V.	Non-Tuition	Hampton
Revere, R. B.	Non-Tuition	Richland
Reynolds. F. B.	Non-Tuition	Greenwood
Rhinehardt, J. B.	Tuition	Gastonia, N. C.
Richardson, M. D.	Non-Tuition	Beaufort
Richardson, R. H.	Tuition	Anderson
Richardson, W. H.	Non-Tuition	Greenwood
Richey, R. M.	Tuition	Carteret, N. J.
Riddle, D. C.	Non-Tuition	York
Riddle, J. L.	Non-Tuition	York
Ridgeway, W. A.	Scholarship	Clarendon
Ridlehuber, W. R.	Scholarship	Greenwood
Riley, J. S.	Non-Tuition	Greenwood
Ripplemeyer, H. A.	Non-Tuition	Chester
Riser, M. C.	Non-Tuition	Aiken
Riser, T. L.	Non-Tuition	Newberry
Rivers, H. L.	Tuition	Greenville, N. C.
Rivers, I. N.	Non-Tuition	Chesterfield
Rivers, W. H.	Non-Tuition	Richland
Roach, S. B.	Tuition	York
Roberts, R. W.	Non-Tuition	Marion
Robertson, J. C.	Non-Tuition	Oconee
Robertson, J. D.	Non-Tuition	Anderson
Robertson, M. K.	Non-Tuition	Greenville
Robertson, W. G.	Tuition	Spartanburg
Robinson, D. H.	Non-Tuition	Fairfield
Robinson, F. I.	Non-Tuition	Greenwood
Robinson, G. W.	Tuition	Asheville, N. C.
Robinson, J. F.	Non-Tuition	Pickens
Robinson, R. J.	Non-Tuition	Richland
Rochester, M. C.	Scholarship	Oconee
Rochester, S. B.	Scholarship	Oconee
Rogers, B. D.	Tuition	Marlboro
Rogers, D. H.	Non-Tuition	Marion
Rogers, E. P.	Non-Tuition	Marion
Rogers, H. L.	Tuition	Anderson
Rogers, H. M.	Tuition	Dilon
Rogers, L. T.	Tuition	Dillon
Rogers, P. G.	Non-Tuition	Marlboro
Rogers, P. L.	Non-Tuition	Marion
Rollins, A. P.	Non-Tuition	Charleston
Rose, B. S.	Tuition	Greenville
Ross, C. W.	Non-Tuition	Florence
Rouse, J. D.	Tuition	Hampton
Rouse, J. T.	Scholarship	Hampton
Rowell, J. Q.	Scholarship	Marion
Royall, E. M.	Tuition	Charleston
Royals, S. T.	Scholarship	Horry
Rudd, K. W.	Tuition	Glenbrook, Conn.
Rush, W. E.	Non-Tuition	Greenwood
Sadler, F. S.	Non-Tuition	Greenville
Salley, E. C.	Tuition	Orangeburg
Salley, F. W.	Tuition	Orangeburg
Salley, G. S.	Non-Tuition	Aiken
Salley, R. J.	Scholarship	Orangeburg
Salley, T. B.	Non-Tuition	Calhoun
Sample, J. W.	Non-Tuition	Saluda
Sander, W. A.	Tuition	Charleston
Sanders, J. G.	Non-Tuition	Richland
Sanders, J. R.	Tuition	Anderson
Sanders, J. W.	Scholarship	Barnwell
Sanders, W.	Non-Tuition	Dorchester
Sartor, T. B.	Non-Tuition	Union
Satcher, J. A.	Non-Tuition	Saluda
Sawyer, C. D.	Non-Tuition	Saluda
Saylors, J. H.	Non-Tuition	Anderson
Scarborough, J. L.	Scholarship	Lee
Schachte, W. L.	Tuition	Pittsfield, Mass.
Schaffer, J. C.	Tuition	Chicago, Ill.
Schirmer, F. B.	Tuition	Charleston
Schroder, H. J.	Tuition	Charleston
Schwartz, S. P.	Tuition	Beaufort
Scott, J. A.	Non-Tuition	Anderson
Scott, J. D.	Non-Tuition	Cherokee
Seabrook, S. G.	Scholarship	Charleston
Sease, E. C.	Non-Tuition	Newberry
Sease, G. A.	Non-Tuition	Newberry
Seawright, Claude A.	Non-Tuition	Anderson
Seawright, Clayton A.	Non-Tuition	Spartanburg
Sedberry, W. B.	Non-Tuition	Chesterfield
Seigler, N. P.	Non-Tuition	Anderson
Self, M. B.	Tuition	Oconee
Senn, C. W.	Non-Tuition	Newberry
Senn, F. O.	Scholarship	Calhoun
Settle, H. G.	Tuition	Spartanburg
Setzler, F. M.	Tuition	Newberry

CLASSIFICATION OF STUDENTS AS REGARDS PAYMENT OF TUITION AND HOLDING OF AGRICULTURAL AND TEXTILE SCHOLARSHIPS—(Continued)

Name	Classification	County
Shannon, F. S.	—Non-Tuition	York
Shannon, J. K.	—Non-Tuition	Richland
Sharp, B. K.	—Non-Tuition	Anderson
Sharpe, F. J.	—Tuition	Charlotte, N. C.
Sharpe, J. R.	—Non-Tuition	Orangeburg
Shaw, A. E.	—Tuition	Richland
Shaw, E. B.	—Non-Tuition	Sumter
Shedd, O. C.	—Scholarship	Fairfield
Sheheen, E. F.	—Tuition	Kershaw
Sheppard, W. A.	—Non-Tuition	Aiken
Sherman, J. E.	—Tuition	Pickens
Shields, W. A.	—Tuition	Richland
Shippey, T. L.	—Tuition	Spartanburg
Shores, R. B.	—Tuition	Spartanburg
Shuler, C. O.	—Scholarship	Aiken
Shuler, N. P.	—Scholarship	Orangeburg
Shull, E. M.	—Tuition	Richland
Sibert, J. A.	—Non-Tuition	McCormick
Siegel, R.	—Tuition	Anderson
Siegel, S.	—Tuition	Anderson
Simons, D. E.	—Non-Tuition	Edgefield
Simons, T. J.	—Tuition	Charleston
Simpson, C. F.	—Scholarship	Laurens
Simpson, P. C.	—Non-Tuition	Anderson
Sims, L. R.	—Non-Tuition	Pickens
Sinclair, B. B.	—Tuition	Union
Singleton, W. G.	—Non-Tuition	Oconee
Sizemore, T. A.	—Tuition	Greenville
Skardon, A. H.	—Non-Tuition	Colleton
Skelton, G.	—Tuition	Greenville
Slade, A. L.	—Tuition	Edgefield
Slaght, F. D.	—Tuition	Darlington
Sloan, A. L.	—Non-Tuition	Greenville
Sloan, E. M.	—Non-Tuition	Anderson
Soan, H. M.	—Tuition	Oconee
Smith, B. C.	—Non-Tuition	Oconee
Smith, G. L.	—Non-Tuition	Anderson
Smith, G. M.	—Schoarship	Greenville
Smith, H. C.	—Tuition	Newberry
Smith, H. M.	—Tuition	Edgefield
Smith, J. F.	—Non-Tuition	Anderson
Smith, J. K.	—Non-Tuition	Greenville
Smith, John Marcus	—Non-Tuition	Greenville
Smith, John Mikel	—Non-Tuition	Saluda
Smith, J. T.	—Tuition	Cedartown, Ga.
Smith, M. H.	—Scholarship	Spartanburg
Smith, M. L.	—Tuition	Laurens
Smith, M. M.	—Non-Tuition	Oconee
Smith, O. R.	—Non-Tuition	Anderson
Smith, R. P.	—Non-Tuition	Spartanburg
Smith, S. W.	—Non-Tuition	York
Smith, T. E.	—Scholarship	Kershaw
Smith, W. L.	—Non-Tuition	Anderson
Smith, W. R.	—Non-Tuition	Greenville
Smoak, C. G.	—Non-Tuition	Orangeburg
Smoak, J. J.	—Tuition	Bamberg
Smoak, J. R.	—Scholarship	Orangeburg
Smoak, R. P.	—Scholarship	Calhoun
Smoak, T. T.	—Non-Tuition	Orangeburg
Smyth, L. F.	—Tuition	Hendersonville, N. C.
Snider, B. M.	—Non-Tuition	Laurens
Snowden, B. E. B.	—Tuition	Charleston
Snowden, J. G.	—Tuition	Charleston
Solomon, H. J.	—Non-Tuition	Oconee
Solomons, W. S.	—Non-Tuition	Hampton
Sorentrue, S.	—Tuition	Charleston
Sowell, D. F.	—Non-Tuition	Kershaw
Sparks, F. L.	—Non-Tuition	Cherokee
Spearman, J. M.	—Tuition	Pickens
Speed, G. M.	—Non-Tuition	Anderson
Spencer, W. H.	—Non-Tuition	York
Speth, E. B.	—Non-Tuition	Oconee
Stanton, F. B.	—Non-Tuition	Dillon
Stanton, W. F.	—Tuition	Dillon
Steer, R. L.	—Scholarship	Laurens
Steinmeyer, W. M.	—Non-Tuition	Beaufort
Stephens, J. H.	—Non-Tuition	Spartanburg
Stephens, L. W.	—Tuition	Dillon
Stephenson, F. B.	—Non-Tuition	York
Stephenson, R. D.	—Non-Tuition	Lee
Steppe, J. T.	—Tuition	Richland
Stevens, C. B.	—Tuition	Charleston
Stevens, W. S.	—Non-Tuition	Marlboro
Stewart, W.	—Non-Tuition	Greenville
Stewart, W. E.	—Non-Tuition	Fairfield
Stone, E. W.	—Tuition	Union
Stone, L. J. P.	—Non-Tuition	Spartanburg
Storen, L. E.	—Tuition	Charleston
Stoudemire, D. O.	—Non-Tuition	Oconee
Stover, E. M.	—Non-Tuition	Fairfield
Strickland, J. R.	—Non-Tuition	Hampton
Strom, L. D.	—Non-Tuition	Edgefield
Suber, C.	—Tuition	Anderson
Suber, H. W.	—Tuition	Newberry
Suber, T. W.	—Tuition	Newberry
Suber, Z. H.	—Tuition	Newberry

CLASSIFICATION OF STUDENTS AS REGARDS PAYMENT OF TUITION AND HOLDING OF AGRICULTURAL AND TEXTILE SCHOLARSHIPS—(Continued)

Name	Classification	County
Sutherland, M. H.	Non-Tuition	Pickens
Svedberg, W. E.	Non-Tuition	Charleston
Swearingen, L. D.	Non-Tuition	Edgefield
Swearingen, M. S.	Non-Tuition	Edgefield
Taggart, C. L.	Non-Tuition	Greenwood
Talbert, J. W.	Scholarship	McCormick
Talbert, T. B	Scholarship	McCormick
Talley, J. F.	Tuition	York
Tarrant, W. H.	Non-Tuition	Greenwood
Tatum, J. H.	Tuition	Opelika, Ala.
Taylor, J. B.	Tuition	Richland
Taylor, T. D.	Non-Tuition	Chester
Taylor, W. C.	Non-Tuition	Greenville
Taylor, William, H.	Non-Tuition	York
Taylor, Woodrow, H.	Non-Tuition	Lexington
Teague, A. S.	Non-Tuition	Richland
Thackson, R. K.	Tuition	Greenville
Thames, W. M.	Non-Tuition	Oconee
Thomas, A. S.	Tuition	Charleston
Thompson, E. M.	Tuition	Manchester, Ga.
Thompson, F. A.	Non-Tuition	Spartanburg
Thompson, F. M.	Tuition	Greenville
Thompson, J. H.	Non-Tuition	Lexington
Thompson, J. W.	Non-Tuition	Charleston
Thompson, W. E.	Tuition	Sumter
Thomson, W. B.	Scholarship	Abbeville
Tindall, J. F.	Tuition	Spartanburg
Todd, C. M.	Tuition	Greenville
Tollison, A. C.	Scholarship	Pickens
Tomlinson, H. W.	Non-Tuition	Florence
Toncray, G. W.	Tuition,	Johnson City, Tenn.
Toth, G.	Tuition	Carteret, N. J.
Touchberry, R. M.	Scholarship	Sumter
Towles, D. Q.	Tuition	Charleston
Towles, J. F.	Tuition	Charleston
Townsend, E. H.	Scholarship	Charleston
Townsend, G. E.	Tuition	Anderson
Townsend, F. W.	Tuition	Colleton
Trammell, W. H.	Non-Tuition	Greenville
Traynham, K. E.	Scholarship	Laurens
Traywick, T. T.	Non-Tuition	Orangeburg
Tribble, W. F.	Non-Tuition	Anderson
Truesdale, F. C.	Non-Tuition	Kershaw
Turner, F. G.	Non-Tuition	Georgetown
Turner, H. F. X.	Non-Tuition	Greenwood
Turner, J.	Tuition	Carteret. N. J.
Turner, J. M.	Non-Tuition	Georgetown
Twitty, W. B.	Non-Tuition	Lancaster
Vance, J.	Non-Tuition	Laurens
Vance, R. B.	Non-Tuition	Laurens
Vance, W. W.	Non-Tuition	Allendale
Van de Erve, M. R.	Tuition	Charleston
Vaughan, H. B.	Scholarship	Charleston
Vaughan, R. S.	Tuition	Darlington
Vaughn, B. M.	Non-Tuition	Spartanburg
Verdin, W. M.	Tuition	Greenville
Verner, S. L.	Tuition	Oconee
Vincent, C. J.	Non-Tuition	Union
Vick, A. T.	Tuition	Savannah, Ga.
Voight, R. J.	Tuition	Charleston
Wait, J. R.	Tuition	Beaumont, Texas
Walker, C. P.	Non-Tuition	Oconee
Walker, E. M.	Non-Tuition	Edgefield
Walker, J. B.	Tuition	Greenwood
Walker, J. S.	Non-Tuition	Oconee
Walker, L. L.	Non-Tuition	Orangeburg
Walker, W. W.	Non-Tuition	Charleston
Wall, J. B.	Non-Tuition	Anderson
Wallenburg, W. G.	Tuition	Aiken
Walters, J. V.	Tuition	Spartanburg
Ward, J. J.	Tuition	Georgetown
Warren, G.	Tuition	Hampton
Watson, J. H.	Non-Tuition	Saluda
Watson, K. M.	Non-Tuition	Pickens
Watson, N. E.	Scholarship	Greenwood
Watson, S. D.	Non-Tuition	Orangeburg
Watson, T. M.	Non-Tuition	Spartanburg
Watson, W. T.	Non-Tuition	Laurens
Wattley, P. A.	Tuition	Chicago, Ill.
Watts, J. G.	Non Tuition	Kershaw
Watts, T. K.	Non-Tuition	Kershaw
Webb, A. A.	Scholarship	Aiken
Webb, H. J.	Scholarship	Aiken
Webb, J. E.	Scholarship	Aiken
Welch, M. B.	Non-Tuition	Florence
Wells, H. B.	Non-Tuition	Greenville
Wells, R. E.	Non-Tuition	Laurens
Werts, A. P.	Non-Tuition	Newberry
Werts, J. R.	Tuition	Greenwood
Wessinger, J. B.	Non-Tuition	Richland
West, J. R.	Non-Tuition	Kershaw
Westmoreland, J B.	Tuition	Anderson
Weston, J. A.	Scholarship	Richland
Whaley, F. M.	Tuition	Charleston
Wheeler, H. M.	Non-Tuition	Clarendon
Whetstone, G. V.	Scholarship	Aiken

CLASSIFICATION OF STUDENTS AS REGARDS PAYMENT OF TUITION AND HOLDING OF AGRICULTURAL AND TEXTILE SCHOLARSHIPS—(Continued)

Name	Classification	County
White, E.	.B—Tuition	Leesburg, Va
White, M.	T.—Non-Tuition	Oconee
White, O.	M.—Scholarship	Oconee
White, W.	J.—Tuition	Charleston
Whitlaw, L.	G.—Non-Tuition	Oconee
Whitlaw, N.	O.—Non-Tuition	Oconee
Whitlock, H.	W.—Non-Tuition	Spartanburg
Whitmire, H.	C.—Non-Tuition	Greenville
Whittington, F.	B.—Non-Tuition	Horry
Whittington, J.	C.—Non-Tuition	Greenwood
Wiggins, C.	F.—Tuition	Florence
Wiggins, J.	W.—Non-Tuition	Jasper
Wiggins, L.	E.—Non-Tuition	Florence
Wilburn, C.	T. S.—Non-Tuition	Union
Williamon, P.	S.—Non-Tuition	Pickens
Williams, A.	E.—Non-Tuition	Anderson
Williams, E.	A.—Non-Tuition	Colleton
Williams, F.	H.—Non-Tuition	Spartanburg
Williams, J.	W.—Non-Tuition	Pickens
Williams, W.	R.—Tuition	Greenville
Williamson, J.	C.—Scholarship	Williamsburg
Willimon, E.	P.—Tuition	Greenville
Willis, E.	B.—Non-Tuition	Anderson
Willis, T.	J.—Scholarship	Spartanburg
Wilson, C.	H.—Non-Tuition	Abbeville
Wilson, H.	B.—Non-Tuition	Newberry
Wilson, H.	S.—Non-Tuition	Anderson
Wilson, J.	P.—Non-Tuition	Allendale
Wilson, R.	L.—Tuition	Anderson
Wilson, V.	C.—Non-Tuition	Newberry
Witherspoon, J.	D.—Non-Tuition	Oconee
Witherspoon, J.	H.—Tuition	Lee
Wofford, W.	L.—Non-Tuition	Laurens
Wolf, S.	—Non-Tuition	Edgefield
Wolfe, J.	E.—Non-Tuition	Orangeburg
Wolfe, W.	S.—Non-Tuition	Spartanburg
Wolff, L.	M.—Tuition	Allendale
Wood, F.	D.—Non-Tuition	Greenville
Wood, J.	R.—Non-Tuition	Laurens
Wood, W.	E.—Non-Tuition	Spartanburg
Woodruff, R.	C.—Non-Tuition	Greenville
Woods, L.	B.—Non-Tuition	Greenville
Woodson, H.	C.—Tuition	Albany, Ga.
Workman, B.	B.—Tuition	Laurens
Workman, J.	T.—Non-Tuition	Laurens
Wray, J.	B.—Scholarship	Spartanburg
Wright, J.	K.—Non-Tuition	Fairfield
Wyant, H.	L.—Non-Tuition	Greenwood
Wyatt, C.	D.—Tuition	Pickens
Wylie, A.	B.—Tuition	York
Wylie, C.	C.—Non-Tuition	York
Yarborough, J.	H.—Non-Tuition	Chester
Yarborough, W.	G.—Non-Tuition	Chester
Yarborough, W.	W.—Non-Tuition	Fairfield
Yeargin, R.	L.—Non-Tuition	Laurens
Yonce, R.	M.—Scholarship	Edgefield
Yongue, P.	G.—Non-Tuition	Chester
Young, D.	A.—Non-Tuition	Cherokee
Young, J.	E.—Tuition	Greenwood
Young, T.	L. H.—Tuition	Pickens
Young, W.	C.—Tuition	Georgetown
Youngblood, A.	R.—Non-Tuition	Barnwell
Zeagler, J.	M.—Non-Tuition	Calhoun
Zeigler, A.	K.—Non-Tuition	Orangeburg
Zimmerman, C.	G.—Non-Tuition	Spartanburg
Zuvich, T.	J.—Tuition	Brooklyn, N. Y.

REPORT OF THE TREASURER

To: The Finance Committee of the Board of Trustees
(Through Dr. E. W. Sikes, President)

Gentlemen:

I have the honor of transmitting herewith my annual report of the financial affairs of The Clemson Agricultural College of South Carolina for the fiscal year ended June 30, 1931.

The following exhibits are submitted for your information:

Particulars	Exhibit
Balance Sheet—Collegiate Activity Funds	A
Cadet Fund	B
Student Banking Account	C
Revolving and Trust Funds	D
Smith-Lever Extension Fund	E
S. C. Experiment Station—Federal Funds	F
Agricultural Research	G
Crop Pests and Diseases	H
Live Stock Sanitary Work	I
General Cash Account	J

Above exhibits are supported by detailed schedules, as to salaries, classification of expenditures, etc.

Respectfully submitted,
S. W. EVANS, Secretary-Treasurer.

BALANCE SHEET
COLLEGIATE ACTIVITY FUNDS

Year Ended June 30, 1931

INCOME

EXHIBIT A

Brought forward to finance during period small fertilizer sales		$ 97,333.56
Receipts:		
Operation of College:		
From Students:		
Tuition	$ 19,614.50	
Maintenance	20,237.57	
Matriculation	4,238.05	
Laboratory fees	2,811.79	$ 46,901.91
From Other Sources:		
Rents	$ 18,085.87	
Interest:		
On bank deposits	$5,095.79	
Trust funds (State Treasurer)	242.44	5,338.23
Electric current & water	11,507.78	
Miscellaneous	1,441.25	36,373.13
Total Income from Operation of College		$ 83,275.04
Federal Government:		
Land Grant Funds		30,754.00
Endowment Funds:		
Interest on Clemson Bequest		3,512.36
Privilege Fertilizer Tax		150,000.00
Legislative Appropriations:		
Salaries—Collegiate Work July 1 to June 30 (Including $155,593.88 paid direct by Comp. General of S. C.)		206,616.81
Total Income—Year Ended June 30, 1931		$474,158.21
State Treasurer of S. C.—Trust Fund:		
Transfer from funds deposited in Trust with State Treasurer of S. C. (See Schedule A-10)		23,124.02
		$594,615.79

BALANCE SHEET
COLLEGIATE ACTIVITY FUNDS

Year Ended June 30, 1931

EXPENDITURES

EXHIBIT A

	Schedules		
Public Service Work:			
Fertilizer Inspection & Analysis	A-1	$ 24,186.21	$ 24,186.21
Collegiate Work:			
Arts and Science Department	A-2	65,470.72	
Agricultural Department	A-3	75,543.59	
Chemistry Department	A-4	22,307.91	
Engineering Department	A-5	65,835.00	
Military Department	A-6	6,348.46	
Textile Department	A-7	39,834.22	
Service Department	A-8	78,254.41	
Miscellaneous Department	A-9	90,938.54	444,532.85
State Treasurer of S. C.—Trust Funds:			
Funds transferred from this account and deposited in Trust with State Treasurer of S. C.	A-10		14,125.02
Total Expenditures and Transfers	A-11		$482,844.08
Carried Forward to Finance during Period of Small Fertilizer Sales—Exhibit J			111,771.71
			$594,615.79

Note: See Schedule A-12 for detailed Collegiate Salary payments.

Public Service Work

Schedule A-1

Fertilizer Inspection & Analysis:				
A-2	Wages:			
	Clerks and Janitors	$1,857.08		
	Inspectors	3,976.50	$	5,833.58
A-3	Legal Services	250.00		
B-1	Freight and Express	120.20		
B-2	Travel	2,152.85		
B-3	Telegraph and Telephone	74.74		
B-5	Fertilizer Bulletins	496.00		
C-4	Office Supplies	538.77		
C-12	Other Supplies (tags, etc.)	3,014.19		
D-2	Post Office Box Rent	6.00		
A-1	Salaries	11,699.88		
	Total Public Service Work		$	24,186.21

Collegiate Work

ARTS AND SCIENCE DEPARTMENT

Schedule A-2

Economics & Sociology Division:				
C-8	Educational Supplies	17.94	$	17.94
English Division:				
G-7	Educational Equipment	102.74		102.74
Mathematics Division:				
B-4	Repairs	1.75		1.75
Office & Unclassified Division:				
A-2	Wages (Janitor)	577.96		
B-2	Travel	200.00		
B-3	Telegraph & Telephone	36.20		
C-8	Supplies	203.32		1,017.48
Physics Division:				
B-4	Repairs	86.28		
C-8	Supplies	92.23		
G-7	Equipment	46.91		225.42
Personal Service:				
A-1	Salaries	64,105.39		64,105.39
	Total Arts & Science Department		$	65,470.72

AGRICULTURAL DEPARTMENT
Schedule A-3

Agricultural Economics Division:				
A-2	Wages	$ 60.00		
C-8	Supplies	175.58	$	235.58
Agronomy Division:				
A-2	Wages	300.00		
B-1	Freight & Express	184.57		
B-4	Repairs	88.86		
C-8	Supplies	292.48		
G-7	Equipment	18.46		884.37
Animal Husbandry Division:				
A-2	Wages	2,511.49		
B-4	Repairs	200.00		
B-7	Contractural Services	14.93		
C-3	Feed & Veterinary Supplies	2,085.00		
C-10	Agricultural Supplies	110.00		
C-12	Other Supplies	113.93		
D-2	Post Office Box Rent	1.50		5,036.85
Botany & Bacteriology Division:				
A-2	Wages	573.65		
B-4	Repairs	139.55		
C-8	Supplies	359.80		1,073.00
Dairy Division:				
A-2	Wages	2,266.68		
B-4	Repairs	160.29		
C-3	Feed & Veterinary Supplies	792.15		
C-4	Office Supplies	27.80		
C-8	Educational Supplies	382.25		
G-7	Equipment	110.95		3,740.12
Educational Division:				
B-1	Freight & Express	10.10		
B-2	Travel	99.99		
B-4	Repairs	13.04		
B-5	Printing	50.00		
B-7	Contractural Services	49.85		
C-4	Office Supplies	49.08		
C-8	Educational Supplies	100.00		
C-9	Motor Vehicle Supplies	266.65		638.71
Entomology & Zoology Division:				
A-2	Wages	293.24		
B-4	Repairs	8.71		
C-4	Office Supplies	14.85		
C-8	Educational Supplies	550.00		
C-10	Other Supplies	200.00		1,066.80

Forestry Division:			
A-2	Wages	81.59	
C-10	Supplies	47.92	129.51
Geology & Mineralogy Division:			
A-2	Wages	30.20	
C-8	Educational Supplies	42.55	72.75
Horticultural Division:			
A-2	Wages	2,277.21	
B-7	Contractural Services	17.50	
C-2	Fuel Supplies	53.03	
C-3	Feed & Veterinary Supplies	397.74	
C-9	Motor Vehicle Supplies	99.74	
C-10	Agricultural Supplies	707.67	
C-12	Other Supplies	184.94	
G-7	Equipment	41.65	3,779.48
Office & Unclassified Division:			
A-2	Wages	965.30	
B-2	Travel	485.03	
B-3	Telephone & Telegraph	400.01	
C-4	Office Supplies	609.91	
C-8	Educational Supplies	125.00	
C-12	Other Supplies	222.84	2,808.09
Poultry Division:			
A-2	Wages	1,710.00	1,710.00
Veterinary Science Division:			
A-2	Wages	600.00	
C-2	Fuel Supplies	9.86	609.86
Personal Service:			
A-1	Salaries	53,758.47	53,758.47
	Total Agricultural Department		$ 75,543.59

CHEMISTRY DEPARTMENT
Schedule A-4

Chemistry Division:			
A-2	Wages	$ 960.00	
B-3	Telegraph and Telephone	35.00	
B-4	Repairs	50.55	
B-7	Contractural Services	49.50	
C-8	Supplies	3,095.93	
G-7	Equipment	50.25	$ 4,241.23
Personal Service:			
A-1	Salaries	18,066.68	18,066.68
	Total Chemistry Department		$ 22,307.91

ENGINEERING DEPARTMENT
Schedule A-5

Civil Engineering Division:				
A-2	Wages	$ 165.00		
B-4	Repairs	253.76		
C-8	Supplies	131.04		
G-7	Equipment	35.00	$	584.80
Drawing Division:				
A-2	Wages	61.00		
B-1	Freight & Express	19.63		
B-2	Travel	5.00		
B-4	Repairs	49.89		
C-8	Supplies	124.95		260.47
Electrical Engineering Division:				
A-2	Wages	175.91		
B-4	Repairs	143.21		
C-8	Supplies	160.26		
G-7	Equipment	150.31		629.69
Engineering Experiment Station Division:				
A-2	Wages	124.98		
C-8	Supplies	120.12		245.10
Forge & Foundry Division:				
A-2	Wages	1,433.36		
B-4	Repairs	203.73		
C-8	Supplies	571.31		2,208.40
Machine Shop Division:				
A-2	Wages	1,236.68		
B-4	Repairs	131.28		
C-8	Supplies	395.62		1,763.58
Mechanical Engineering Division:				
A-2	Wages	57.66		
B-4	Repairs	281.76		
C-8	Supplies	142.98		482.40
Office & Unclassified Division:				
A-2	Wages	1,120.70		
B-1	Freight & Express	46.76		
B-2	Travel	182.73		
B-4	Repairs	51.16		
C-4	Office Supplies	199.43		
C-8	Educational Supplies	40.00		
C-12	Other Supplies	99.52		
D-2	Post Office Box Rent	6.00		1,881.80

Wood Shop Division:				
A-2	Wages		499.87	
B-4	Repairs		143.20	
C-8	Supplies		611.03	1,254.10
Personal Service:				
A-1	Salaries		56,524.66	56,524.66
	Total Engineering Department			$ 65,835.00

MILITARY DEPARTMENT
Schedule A-6

Office & Unclassified Division:				
B-3	Telegraph and telephone	$	83.48	
B-4	Repairs		349.95	
C-4	Office Supplies		456.36	
C-8	Educational Supplies		308.75	$ 1,198.54
Personal Service:				
A-1	Salaries		5,149.92	5,149.92
	Total Military Department			$ 6,348.46

TEXTILE DEPARTMENT
Schedule A-7

Carding & Spinning Division:				
A-2	Wages	$	79.60	
B-4	Repairs		432.66	
C-8	Supplies		206.98	$ 719.24
Chemistry & Dyeing Division:				
A-2	Wages		160.15	
B-4	Repairs		124.84	
C-8	Supplies		1,273.54	1,558.53
Industrial Education Division:				
A-2	Wages		277.49	
B-2	Travel		212.01	
B-4	Repairs		19.68	
C-8	Educational Supplies		49.46	
C-4	Office Supplies		45.37	
C-9	Motor Vehicle Supplies		79.16	683.17
Office & Unclassified Division:				
A-2	Wages		1,490.35	
B-1	Freight & Express		288.04	
B-2	Travel		255.24	
B-3	Telegraph & Telephone		157.69	
C-4	Office Supplies		324.80	
C-12	Other Supplies		146.93	2,663.05

Weaving & Designing Division:				
A-2	Wages		1,453.25	
B-4	Repairs		638.79	
C-8	Supplies		580.17	2,672.21
Personal Service:				
A-1	Salaries		31,538.02	31,538.02
	Total Textile Department			$ 39,834.22

SERVICE DEPARTMENT
Schedule A-8

Construction & Repair Division:				
A-2	Wages:			
	Superintendent	$2,800.00		
	Asst. Superintendent	1,800.00		$ 4,600.00
B-3	Telephone & Telegraph			58.55
B-4	Repairs:			
	Maintenance Bldgs.	$19,219.04		
	Maintenance Bar's	3,183.08		22,402.12
C-9	Motor Vehicle Supplies			321.93
C-12	Other Supplies		4.17	
F-1	Materials		497.52	
G-4	Truck		600.00	
G-8	Shop Machines		500.00	
H-2	Corn Crib		368.55	$ 29,352.84
Grounds, Roads & Transportation Division:				
A-2	Wages		8,392.33	
B-3	Telephone & Telegraph		41.88	
B-4	Repairs		477.20	
B-7	Contractural Services		30.75	
C-3	Feed & Veterinary Supplies		749.66	
C-9	Motor Vehicle Supplies		1,013.05	
C-10	Agricultural Supplies		1,390.28	
C-12	Other Supplies		148.77	
G-4	Truck		700.00	
G-5	Mower & Rakes		68.50	
H-2	Non-Structural Improvements		2,673.83	
A-1	Salaries: (Superintendent)		3,249.96	18,936.21

Heat, Light & Water Division:				
A-2	Wages		8,088.59	
B-3	Telephone & Telegraph		81.35	
B-4	Repairs			
	Ordinary Repairs	$1,836.48		
	Hosp. Heating Plant	2,678.39	4,514.87	
C-2	Coal & Electric Current		17,000.00	
C-12	Other Supplies		280.55	29,965.36
	Total Service Department			$ 78,254.41

MISCELLANEOUS DEPARTMENT
Schedule A-9

Alumni Office Division:				
A-1	Salaries		$ 1,600.00	
B-2	Travel		75.77	
B-3	Telegraph & Telephone		39.34	
C-4	Office Supplies		108.30	
C-12	Other Supplies		105.73	$ 1,929.14
Business Manager's Office:				
A-1	Salaries		$ 3,999.96	
A-2	Wages		803.73	
B-2	Travel		46.17	
B-3	Telegraph & Telephone		64.94	
B-4	Repairs		43.15	
C-4	Office Supplies		402.84	
C-9	Motor Vehicle Supplies		3.07	
C-12	Other Supplies		33.81	
D-2	Post Office Box Rent		3.00	
G-4	Motor Vehicles		200.00	$ 5,600.00
Contingent Fund Division:				
A-2	Wages		179.40	
A-3	Special Payments		50.00	
B-1	Freight & Express		2.43	
B-2	Travel		142.00	
B-4	Repairs		12.50	
B-5	Printing		12.50	
C-4	Office Supplies		96.34	
C-9	Motor Vehicle Supplies		21.40	
C-12	Other Supplies		523.20	
D-10	Fixed Charges		40.00	
G-1	Office Equipment		16.66	
G-7	Educational Equipment		543.00	1,639.43

Library Division:

A-1	Salaries	5,541.67	
A-2	Wages	500.00	
B-2	Travel	75.00	
B-3	Telegraph & Telephone	37.95	
B-4	Repairs	8.00	
B-7	Contractural Services (Binding)	396.26	
C-8	Supplies	1,047.55	
D-2	Rents	6.00	
D-10	Fixed Charges	45.00	
G-7	Educational Equipment	146.08	7,803.51

Miscellaneous Items:

A-1	Salaries		9,316.63	
A-2	Wages:			
	Caretaker Calhoun Mansion	$ 300.00		
	Wages, Trustee House	73.30		
	Night Watchmen	1,752.33	2,125.63	
C-4	Office Supplies		74.08	
C-9	Motor Vehicle Supplies		295.62	
C-12	Other Supplies		37.07	
D-4	Insurance & Bonds		7,751.60	
D-9	Contributions		26.11	
D-10	Fixed Charges:			
	Membership Nat. Ass'ns	$255.00		
	Student's Medals etc.	260.00	515.00	
H-2	Non-structural Improvements		500.00	
D-2	Rent—land		75.00	

Expenses—Trustees et al:

A-2	Wages	$ 137.12		
A-3	Special Payments	223.60		
B-2	Travel	1,285.26		
B-3	Telegraph & Telephone	18.32		
C-4	Office Supplies	19.70		
C-12	Other Supplies	11.66		
G-3	Household Equipment	100.00	1,795.66	22,512.40

President's Office:				
A-1	Salaries		$ 15,891.55	
A-2	Wages		2,199.84	
B-2	Travel		666.16	
B-3	Telegraph and Telephone		280.67	
B-5	Printing, Pamphlets, Catalog, etc.		1,255.25	
C-4	Office Supplies		1,724.68	
C-8	Educational Supplies		150.11	
D-2	Post Office Box Rent		6.00	
D-10	Medals (Simpson)		25.00	$ 22,199.26
Scholarships:				
B-5	Printing, etc.		609.09	
D-6	Aid for Education-Scholarships		15,925.26	16,534.35
Treasurer's Office:				
A-1	Salaries		7,799.98	
A-2	Wages		1,723.34	
A-3	Special Payments		198.94	
B-2	Travel		8.16	
B-3	Telegraph & Telephone		169.40	
B-4	Repairs		20.00	
C-4	Office Supplies		1,676.24	
D-2	Post Office Box Rent		6.00	
G-1	Office Equipment		157.72	11,759.78
Tuition Refunds to Students:				
D-8	Tuition Refunds	960.00		960.00
	Total Miscellaneous Department			$ 90,938.54

State Treasurer of South Carolina Trust Funds

Schedule A-10

Tuition and Undersignated Fees Deposited in Trust with State Treasurer in accordance with law.

Balance on deposit, July 1, 1930		$ 8,999.00
Deposits of Current Year:		
Transfers from College cash	14,125.02	
		23,124.02
Withdrawals During Year:		
Transfers from State Treasurer to College and Cash Account		$ 23,124.02
Balance in State Treasury, June 30, 1931		NONE

Consolidated Classification of Departmental Expenditures

Schedule A-11

COLLEGIATE OPERATION

A—Personal Service:			
1. Salaries:			
By College Treasurer	$121,174.01		
By Compt. Gen. .S C.	155,368.88	$276,542.89	
2. Wages		49,933.30	
3. Special Payments		472.54	$326,948.73
B—Contractural Service:			
1. Freight, Express & Deliveries		551.53	
2. Travel		4,098.52	
3. Telegraph & Telephone		1,640.28	
4. Repairs		31,050.78	
5. Printing Catalogs, Bulletins, etc.		1,926.84	
7. Other Contractural Services		558.79	39,826.74
C—Supplies:			
2. Fuel & Electric Current		17,062.89	
3. Feed & Veterinary Supplies		4,024.55	
4. Office Supplies		5,829.78	
7. Refrigerating Supplies		102.74	
8. Educational Supplies		11,350.95	
9. Motor Vehicle Supplies		2,100.62	
10. Agricultural Supplies		2,455.87	
12. Other Supplies		1,913.12	44,840.52
D—Fixed Charges and Contributions:			
2. Rents		103.50	
4. Insurance		7,751.60	
6. Aid for Education (Scholarships)		15,925.26	
8. Refunds (Tuition)		960.00	
9. Contributions		26.11	
10. Other Fixed Charges		625.00	25,391.47
F—Materials:			
1. Materials (Lumber, etc.)		497.52	497.52
G—Equipment:			
1. Office Equipment		174.38	
3. Houshold Equipment		135.00	
4. Motor Vehicles & Equipment		1,500.00	
5. Motorless Vehicles & Equipment		68.50	
7. Educational Equipment		1,107.61	
8. Other Equipment		500.00	3,485.49
H—Lands & Structures:			
2. Non-structural Improvements		3,542.38	3,542.38
Total Collegiate Operation			$444,532,85

Transfers:	
Funds deposited in Trust with State Treasurer of South Carolina----	14,125.02
Public Service Work:	
Fertilizer Inspection & Analysis: Sundry Expenditures as Classified in Schedule A-1 ----------	24,186.21
Total Disbursements College Account	$482,844.08

Schedule of Salaries Paid—Collegiate Activities

Schedule A-12

YEAR ENDED JUNE 30, 1931

1—Fertilizer Inspection & Analysis:		
Secretary Board Fertilizer Control ----------	$ 3,724.92	
Chemist & Toxicologist ----------	3,075.00	
First Assistant Chemist ----------	2,499.96	
Second Assistant Chemist ----------	2,400.00	$ 11,699.88
2—Arts & Science Department:		
Director & Professor of English ----------	3,499.92	
Professors:		
Mathematics, 1 at $3,000; 1 at 2,699.91--	5,699.91	
Modern Languages ----------	3,000.00	
Economics and Sociology ----------	3,000.00	
English ----------	3,000.00	
Physics, 2 at 3,000; 1 at 2,499.96 -----	8,499.96	
Rural Sociology ----------	3,000.00	
History ----------	2,800.00	
Associate Professors:		
Math., 1 each at 3,000; 3,025; 2,500 ----	8,525.00	
History & Economics ----------	3,000.00	
English ----------	3,000.00	
Assistant Professors:		
Physics ----------	2,500.00	
English, 2 at 2,500; 1 at 2,400 ----------	7,400.00	
Mathematics ----------	1,958.30	
Instructors:		
Physics ----------	1,800.00	
Academic Work ----------	1,283.33	
History ----------	499.50	
Emeritus Professor ----------	1,000.00	
Coach for Musical Organizations ----------	250.00	
Inst. English, part time ----------	389.47	64,105.39

3—Agricultural Department:		
Prof. Geology & Mineralogy and Director Resident Teaching	3,549.96	
Professors:		
Agronomy	1,811.10	
Dairying	1,777.74	
Botany & Bacteriology	1,999.95	
Entomology & Zoology	1,999.96	
Horticulture	1,266.66	
Animal Husbandry	1,200.00	
Agricultural Education	1,600.00	
Poultry Husbandry	2,999.96	
Veterinary Science	2,999.96	
Agricultural Economics	1,000.00	
Associate Professors:		
Bacteriology	2,600.00	
Agricultural Education	1,200.00	
Dairying	2,600.00	
Botany	2,600.00	
Agronomy	2,599.92	
Agricultural Engineering	2,400.00	
Horticulture	2,400.00	
Animal Husbandry	2,400.00	
Assistant Professors:		
Agricultural Economics	1,200.00	
Entomology & Zoology	2,399.98	
Instructors:		
Botany	2,000.00	
Agronomy	1,374.98	
Zoology & Entomology	1,200.00	
Supt. Poultry Plant	1,800.00	
Stenographers:		
Agricultural Department	1,233.32	
Botany & Bacterology	126.66	
Agronomy	1,060.02	
Horticulture	150.00	
Teaching Fellowships	208.30	$ 53,758.47
4—Chemistry Department:		
Director Chemistry Dep't and State Chemist	3,750.00	
Professors:		
Chemistry, 1 at 1,200; 1 at 2,500	3,700.00	
Associate Professor of Chemistry	2,500.00	
Assistant Prof. of Chemistry, 1 at 2,499.98; 1 at 2,000	4,499.98	
Instructors, Chemistry, 2 at 1,600	3,200.00	
Teaching Fellowships	416.70	18,066.68

5—Engineering Department:		
Director & Prof. Mechanical Engr.	4,749.97	
Professors:		
Mechanical Engineering	3,600.00	
Elec. Engr., 1 at 3,200; 1 at 2,900.01	6,100.01	
Drawing & Architecture	3,000.00	
Mechanics	3,000.03	
Civil Engineering	2,799.96	
Associate Professors:		
Mechanical Engineering	2,500.00	
Architecture	2,500.00	
Drawing	2,800.00	
Civil Engr., 1 at 2,624.98; 1 at 2,199.95	4,824.93	
Machine Shop	2,499.96	
Wood Shop	2,499.96	
Forge & Foundry	2,499.96	
Assistant Professors:		
Drawing	2,000.00	
Architecture	2,000.00	
Instructors:		
Engineering, 1 at 2,299.92; 1 at 2,000	4,299.92	
Electrical Engineering	2,000.00	
Stenographer	1,200.00	
Emergency Instructor Engineering	1,483.32	
Teaching Fellowship	166.64	56,524.66
6—Military Department:		
Director Military Dept., Prof. Military Science and Commandant	2,000.00	
Associate Commandants	1,087.47	
Quartermaster	750.00	
Office Assts. to Commandant	1,312.45	5,149.92
7—Textile Department:		
Director Textile Department	4,999.92	
Professors:		
Bleaching, Dyeing & Finishing	4,000.00	
Textile Chemistry & Dyeing	3,000.00	
Carding & Spinning	3,000.00	
Weaving & Designing	3,000.00	
Associate Professor Weaving	2,575.00	
Assistant Professors:		
Carding & Spinning	2,499.98	
Industrial Education	2,199.95	

Instructors:			
Textile Industry, 1 at 2,000; 1 at 243.00		2,243.00	
Industrial Education		1,333.30	
Textiles		1,041.64	
Stenographer & Laboratory Assistant		165.00	
Stenographer		495.00	
Emergency Instructor Textiles		16.66	
Instructor & Laboratory Assistants, 1 at 351.65; 1 at 200.00		551.65	
Teaching Fellowhsips		416.92	31,538.02
8—Service Department:			
Supt. Grounds, Roads, & Hauling		3,249.96	3,249.96
9—Miscellaneous Departments:			
Alumni Office:			
Director of Publicity	$1,600.00		1,600.00
Business Manager's Office:			
Business Manager	3,999.96		3,999.96
Library Division:			
Librarian	2,000.00		
Assistants—1 at 1,500; 1 at 1,191.67	2,691.67		
Retired Librarian	750.00		
Agric. Librarian	100.00		5,541.67
Miscellaneous Items:			
Y. M. C. A. Secretary	500.00		
Campus Marshall	1,916.67		
Magistrate	100.00		
Chaplains (4)	2,800.00		
Prof. Corrective Exer's	3,999.96		9,316.63
President's Office:			
President	8,750.00		
Sec'ty to President	1,600.00		
Registrar	3,124.92		
Assts. to Registrar, 1 at 916.-63; 1 at 1,500	2,416.63		15,891.55
Treasurer's Office:			
Secretary & Treasurer	1,900.02		
Bookkeeper	2,149.96		
Asst. Bookkeeper	2,550.00		
Asst. to Treasurer	1,200.00	7,799.98	44,149.79
Total Salaries—Collegiate Activities			$288,242.77

CADET FUND
EXHIBIT B
(Overdrafts Indicated by *)

Reserve Account:				
Balance, July 1, 1930			$ 27,230.80	
Receipts			74.47	
			$ 27,305.27	
Expenditures:				
A-1	Salaries		500.00	
A-2	Wages		1,681.12	
B-2	Travel		96.08	
B-4	Repairs		3,594.75	
C-12	Supplies		1,132.28	
D-4	Insurance		192.00	
G-3	Household Equipment		711.00	
G-8	Other Equipment		5,853.02	
H-2	Non-structural Improvements		136.70	
H-3	Buildings		9,693.89	
	Total Expenditures		23,590.84	
	Credit Balance		3,714.43	$ 3,714.43
			$ 27,305.27	
Heat, Light & Water:				
Receipts			$ 22,274.98	
	Balance June 30, 1931 (Overdraft)		932.80	$ 932.80*
			$ 23,207.78	
Expenditures:				
A-2	Wages		$ 7,421.31	
B-4	Repairs		2,308.37	
B-3	Telegraph and Telephone		10.50	
B-7	Other Contractural Services		1.50	
C-2	Fuel		10,749.71	
C-4	Office Supplies		12.00	
C-9	Motor Vehicles Supplies		118.06	
C-12	Other Supplies		1,491.99	
D-2	Rents		1.50	
D-8	Refunds		354.17	
G-4	Motor Vehicles & Equipment		515.40	
G-8	Other Equipment		223.27	
	Total Expenditures		$ 23,207.78	

Hospital Division:			
Receipts		$ 16,033.84	
Balance June 30, 1931 (overdraft)		1,828.42	$ 1,828.42*
		$ 17,862.26	
Expenditures:			
A-1	Salaries	$ 4,500.00	
A-2	Wages	4,459.73	
A-3	Special Payments	3,197.10	
B-1	Freight & Express	39.12	
B-2	Travel	189.99	
B-3	Telegraph & Telephone	172.92	
B-4	Repairs	574.82	
C-1	Food Supplies	1,568.47	
C-2	Fuel	134.75	
C-4	Office Supplies	152.14	
C-5	Laundry Supplies	12.41	
C-6	Medical Supplies	1,571.18	
C-12	Other Supplies	64.72	
D-8	Refunds	110.45	
D-10	Other Fixed Charges	30.00	
G-1	Office Equipment	167.22	
G-2	Medical Equipment	524.36	
G-3	Household Equipment	360.10	
H-3	Buildings	32.78	
	Total Expenditures	$ 17,862.26	
Incidentals Division:			
Receipts		$ 12,402.02	
Expenditures:			
A-1	Salaries	$ 949.95	
A-2	Wages	3,578.30	
B-3	Telephone and Telegraph	33.00	
B-4	Repairs	163.65	
C-8	Educational Supplies	915.75	
C-12	Other Supplies	2,067.86	
D-8	Refunds	88.75	
G-3	Household Equipment	1,836.42	
	Total Expenditures	9,633.68	
	Credit Balance	2,768.64	$ 2,768.64
		$ 12,402.32	

Laundry Division:				
Receipts			$ 19,612.95	
Expenditures:				
A-1	Salaries		$ 249.97	
A-2	Wages		12,826.40	
B-3	Telegraph and Telephone		38.35	
B-4	Repairs		886.80	
B-5	Printing		106.10	
C-2	Fuel		495.88	
C-5	Laundry Supplies		2,941.86	
C-9	Motor Vehicle Supplies		7.62	
C-11	Clothing & Dry Goods		240.65	
C-12	Other Supplies		47.57	
D-8	Refunds		235.46	
G-8	Equipment		872.77	
	Total Expenditures		$ 18,949.43	
	Credit Balance		663.52	$ 663.52
			$ 19,612.95	
Subsistence Division:				
Receipts			$202,664.47	
Expenditures:				
A-1	Salaries		$ 3,750.00	
A-2	Wages		24,445.91	
B-2	Travel		97.92	
B-3	Telegraph & Telephone		333.58	
B-4	Repairs		13,964.27	
B-5	Printing		59.06	
B-7	Other Contractural Services		963.74	
C-1	Food Supplies		120,582.80	
C-2	Fuel		681.89	
C-4	Office Supplies		117.20	
C-7	Refrigerating Supplies		91.57	
C-9	Motor Vehicle Supplies		522.26	
C-12	Other Supplies		5,765.79	
D-8	Refunds		6,957.11	
D-10	Other Fixed Charges		25.00	
G-3	Household Equipment		535.55	
G-8	Other Equipment		1,677.05	
H-3	Buildings		1,836.89	
	Total Expenditures		182,407.59	
	Credit Balance		20,256.88	$ 20,256.88
			$202,664.47	

Student Activities Division:				
Receipts			$ 35,177.66	
Expenditures:				
A-1	Salaries		$ 1,500.00	
A-2	Wages		639.95	
A-3	Special Payments		750.00	
B-1	Freight & Express		3.10	
B-2	Travel		203.39	
B-3	Telegraph & Telephone		7.92	
B-4	Repairs		1,193.57	
B-5	Printing		9,896.94	
B-7	Contractural Services		525.00	
C-4	Office Supplies		82.67	
C-9	Motor Vehicle Supplies		7.74	
C-12	Other Supplies		161.07	
D-1	Payment of Debt (Field House)		10,000.00	
D-2	Rents		1.75	
D-3	Interest (On Field House)		2,446.98	
D-4	Insurance		18.00	
D-8	Refunds		216.22	
D-10	Other Fixed Charges		101.00	
E-1	Paid on Physical Education Division Account		5,430.93	
G-8	Equipment		800.00	
	Total Expenditures		$ 33,986.23	
	Credit Balance		1,191.43	$ 1,191.43
			$ 35,177.66	
Uniforms Division:				
Receipts			$ 70,248.14	
Expenditures:				
A-3	Special Payments		$ 50.00	
C-11	Uniforms purchased		52,734.74	
D-8	Refunds to Students		17,379.15	
	Total Expenditures		70,163.89	
	Credit Balance		84.25	$ 84.25
			$ 70,248.14	
Physical Education Division:				
Receipts			$ 5,430.93	
	Balance June 30, 1931 (Overdraft)		5,774.41	$ 5,774.41*
			$ 11,205.34	

Expenditures:

Balance brought forward July 1, 1930, (Overdraft)	$ 11,155.34	
A-2 Wages	50.00	
	$ 11,205.34	
Net credit Balance Cadet Fund		$ 20,143.52

(See Exhibit J)

Recapitulation of Balances

CADET FUND

Credit Balances:

Reserve Account	$ 3,714.43	
Incidentals Division	2,768.64	
Laundry Division	663.52	
Subsistence Division	20,256.88	
Student Activities Division	1,191.43	
Uniforms Division	84.25	$ 28,679.15

Debit Balances: (Overdrafts)

Heat, Light and Water Division	$ 932.80	
Hospital Division	1,828.42	
Physical Education Division	5,774.41	
Total Overdrafts (Deduct)	$ 8,535.63	$ 8,535.63
Net Credit Balance		$ 20,143.52

Student Banking Account

EXHIBIT C

YEAR ENDED JUNE 30, 1931

Balance on Hand, July 1, 1930	$ 1,590.99	
Deposits, Current Year	103,049.88	
	$104,640.87	
Checks—Paid Current Year	$102,595.24	
Balance June 30, 1931	2,045.63	
	$104,640.87	

(See Exhibit J)

REVOLVING FUNDS
EXHIBIT D

(Note: Debit Balances, or Overdrafts, Indicated by *)

Veterinary Hospital:			
Credit Balance, brought forward	$ 83.69		
Receipts	228.05		
	311.74		
Expenditures:			
C-3 Feed & Veterinary Supplies	222.93		
Credit Balance	88.81	$ 88.81	
	311.74		
Hog Cholera Serum Work:			
Credit Balance, brought forward	$ 22,863.62		
Receipts	40,453.71		
	63,317.33		
Expenditures:			
A-1 Salaries	13,252.50		
B-2 Travel	7,873.39		
C-3 Supplies	20,155.41		
Total Expenditures	41,281.30		
Credit Balance	22,036.03	$ 22,036.03	
	63,317.33		
Nursery Tag Sales:			
Credit Balance brought forward	$ 1,147.03		
Receipts	1,217.01		
	2,364.04		
Expenditures:			
B-2 Travel	66.08		
C-12 Supplies	1,151.37		
D-9 Contributions	25.00		
Total Expenditures	1,242.45		
Credit Balance	1,121.59	$ 1,121.59	
	2,364.04		

Summer School:				
Credit Balance brought forward			$ 3,786.98	
Receipts			2,758.50	
			6,545.48	
Expenditures:				
A-1	Salaries		2,960.00	
A-2	Wages		121.50	
B-2	Travel		30.66	
B-3	Telegraph & Telephone		2.55	
B-5	Printing & Advertising		73.55	
C-2	Fuel		40.00	
C-4	Office Supplies		16.00	
C-8	Educational Supplies		65.94	
D-8	Refunds		5.00	
	Total Expenditures		3,315.20	
	Credit Balance		3,230.28	$ 3,230.28
			6,545.48	
Athletic Association:				
Receipts			$ 44,179.56	
			44,179.56	
Debit Balance brought forward July 1, 1930			28.95	
Expenditures:				
A-1	Salaries		16,214.63	
A-2	Wages		410.32	
A-3	Special Payments		1,109.95	
B-1	Freight & Express		133.08	
B-2	Travel		10,554.29	
B-3	Telegraph & Telephone		228.29	
B-4	Repairs		957.40	
B-5	Printing & Advertising		200.83	
B-7	Contractural Services		2,866.33	
C-4	Office Supplies		63.14	
C-9	Motor Vehicle Supplies		218.64	
C-12	Other Supplies		8,700.20	
D-10	Other Fixed Charges		967.99	
	Total		42,654.04	
	Credit Balance		1,525.52	$ 1,525.52
			44,179.56	

Textile Department:			
Credit Balance brought forward	$ 416.50		
Receipts	2,538.46		
	2,954.96		
Expenditures:			
A-2 Wages	408.68		
B-4 Repairs	.61		
B-7 Contractural Services	17.85		
C-4 Office Supplies	24.48		
C-8 Educational Supplies	180.57		
G-7 Educational Equipment	859.50		
Total Expenditures	1,491.69		
Credit Balance	1,463.27	$	1,463.27
	2,954.96		
Wood Shop Division:			
Credit Balance brought forward	$ 52.34		
Receipts	10.00		
	62.34		
Expenditures:			
C-12 Supplies	33.19		
Credit Balance	29.15	$	29.15
	62.34		
Cooperative Cotton Testing:			
Credit Balance brought forward	$ 707.88		
Receipts	416.80		
	1,124.68		
Expenditures:			
A-2 Wages	33.36		
B-2 Travel	165.20		
B-3 Telegraph & Telephone	25.70		
B-4 Repairs	134.19		
G-7 Equipment	271.84		
Total Expenditures	630.29		
Credit Balance	494.39	$	494.39
	1,124.68		

Smith-Hughes Fund:				
Receipts			$ 17,671.45	
Debit Balance, June 30, 1931			8,772.75	$ 8,772.75*
			26,444.20	
Debit Bal. brought forward, July 1, 1930			9,364.02	
Expenditures:				
A-1	Salaries	$13,144.36		
A-1	Sal. (Sum. Sch.)	298.60		
B-2	Travel	2,583.10		
B-3	Tel. & Telephone	130.08		
B-5	Printing	400.00		
C-4	Office Supplies	299.04		
D-6	Aid for Education	225.00	17,080.18	
			26,444.20	
Insurance Sinking Fund:				
Receipts			$ 197.21	
Debit Balance, June 30, 1931			905.77	$ 905.71*
			1,102.98	
Debit Bal. brought forward July 1, 1930			294.45	
Expenditures:				
D-4	Insurance		808.53	
			1,102.98	
Smith-Lever Interest Fund:				
Credit Balance brought forward			$ 1,186.81	
Receipts			3,910.48	
			5,097.29	
Expenditures:				
A-1	Salaries		110.15	
A-2	Wages		124.98	
A-3	Special Payments		5.00	
B-1	Freight & Express		2.50	
B-2	Travel		816.95	
B-3	Telegraph & Telephone		159.60	
B-4	Repairs		12.00	
B-5	Printing Bulletins		198.12	
B-7	Contractural Services		241.45	

C-4	Office Supplies	88.19	
C-12	Other Supplies	76.40	
D-2	Rent	92.21	
D-4	Insurance	812.95	
D-10	Other Fixed Charges	25.00	
G-1	Office Equipment	26.28	
H-1	Lands & Structures	370.50	
H-3	Buildings	98.53	
	Total Expenditures	3,260.81	
	Credit Balance	1,836.48	$ 1,836.48
		5,097.29	

Upkeep of Residences:

Receipts	$ 18,098.37	
Expenditures:		
G-3 Household Equipment	2.50	
H-3 Garages, etc.	10.00	
Transferred to College Account	18,085.87	
Total Expenditures and Transfers	18,098.37	
Balance	000.00	$ 000.00

Miscellaneous Petty Receipts:

Credit Balance brought forward	$ 1,117.18	
Receipts	24,365.15	
	25,482.33	
Expenditures:		
B-4 Repairs	72.50	
C-3 Feed & Veterinary Supplies	6.04	
C-8 Educational Supplies	74.10	
D-8 Refunds	15.00	
E-1 Contingent	10.00	
G-7 Educational Equipment	64.28	
H-3 Buildings	149.75	
Transfers to College Account	25,090.66	
Total Expenditures and Transfers	25,482.33	
Balance	000.00	$ 000.00

Advanced Register Testing:			
Credit Balance brought forward	$ 446.30		
Receipts	3,547.99		
	3,994.29		
Expenditures:			
A-2 Wages	1,796.67		
B-2 Travel	1,269.18		
B-3 Telegraph & Telephone	10.61		
C-4 Office Supplies	28.84		
C-12 Other Supplies	35.00		
G-8 Other Equipment	40.74		
Total Expenditures	3,181.04		
Credit Balance	813.25	$	813.25
	3,994.29		
National Fertilizer Fund:			
Credit Balance brought forward	$ 106.36		
Receipts	1,000.00		
	1,106.36		
Expenditures:			
A-1 Salaries	450.00		
B-2 Travel	276.79		
Total Expenditures	726.79		
Credit Balance	379.57	$	379.57
	1,106.36		
Library Division:			
Credit Balance brought forward	$ 139.62		
Receipts	72.35		
	211.97		
Expenditures:			
A-2 Wages	48.80		
B-2 Travel	12.67		
C-8 Supplies	103.85		
Total Expenditures	165.32		
Credit Balance	46.65	$	46.65
	211.97		

Public Utilities Division:				
Credit Balance brought forward			$ 3,215.74	
Receipts			20,084.29	
			23,300.03	
Expenditures:				
A-2	Wages		1,372.63	
B-2	Travel		218.11	
B-3	Telegraph & Telephone		3.10	
B-4	Repairs		3,327.39	
B-7	Contractural Services		2.65	
C-2	Fuel Supplies		9,468.16	
C-4	Office Supplies		60.60	
C-9	Motor Vehicle Supplies		3,248.34	
C-12	Other Supplies		1,218.10	
D-2	Rents		1.50	
D-10	Fixed Charges		18.00	
G-1	Office Equipment		79.00	
G-3	Household Equipment		209.26	
G-8	Other Equipment		437.55	
H-2	Non-structural Improvements		12.60	
H-3	Buildings		101.35	
Total Expenditures			19,778.34	
Credit Balance			3,521.69	$ 3,521.69
			23,300.03	
Group Insurance:				
Receipts			$ 7,736.55	
Debit Balance, June 30, 1931			5,108.81	$ 5,108.81*
			12,845.36	
Debit Bal. brought forward July 1, 1931			2,837.88	
Expenditures:				
D-4	Insurance Premiums		10,007.48	
			12,845.36	
Chemistry Division:				
Credit Balance brought forward			$ 28,29	
Receipts			163.41	
			191.70	

Expenditures:

B-1	Freight & Express	1.77	
B-7	Contractural Services	5.00	
G-7	Equipment	173.52	
	Total Expenditures	180.29	
	Credit Balance	11.41	$ 11.41
		191.70	

Labor and Power Cost Studies:

Credit Balance brought forward	$ 140.47	
Receipts	000.00	
	140.47	
Expenditures	000.00	
Credit Balance	140.47	$ 140.47

Alumni Building Fund:

Credit Balance brought forward	$ 28,951.03	
Receipts	73.00	
	29,024.03	

Expenditures:

D-8 Refunds	245.92	
Credit Balance	28,778.11	$ 28,778.11
	29,024.03	

Clemson College Hotel:

Receipts	$ 15,847.97	
Debit balance June 30, 1931	1,234.30	$ 1,234.30*
	17,082.27	

Debit Bal. brought forward July 1, 1930			2,063.09	
Expenditures:				
A-1	Salaries	$1,500.00		
A-2	Wages	2,644.00		
B-3	Telegraph & Tele.	46.20		
B-4	Repairs	111.91		
B-6	Water, Heat, Light & Power	186.31		
B-7	Contract. Serv.	515.89		
C-1	Food Supplies	8,483.88		
C-2	Fuel Supplies	1,014.63		
C-2	Other Supplies	452.26		
G-3	Household Equipment	64.10	15,019.18	
			17,082.27	
Chilean Nitrate Educational Bureau:				
Receipts			$ 1,500.00	
Debit Bal. brought forward July 1, 1930			111.47	
Expenditures:				
A-1	Salaries	565.00		
B-2	Travel	607.32		
B-7	Contract. Serv.	1.19		
C-10	Freight & Exp.	1.23	1,174.74	
			1,286.21	
	Credit Balance		213.79	$ 213.79
			1,500.00	
Agricultural Education:				
Credit Balance brought forward			$ 279.19	
Receipts			999.75	
			1,278.94	
Expenditures:				
B-5	Printing Bulletins		893.39	
	Credit Balance		385.55	$ 385.55
			1,278.94	

Potash Research:

Credit Balance brought forward		$ 611.69	
Receipts		6,120.00	
		6,731.69	
Expenditures:			
A-1 Salaries		395.83	
A-2 Wages		1,277.39	
B-2 Travel		1,143.24	
C-9 Motor Vehicle Supplies		28.70	
C-10 Agricultural Supplies		1,060.33	
C-12 Other Supplies		53.63	
G-8 Equipment		31.06	
H-3 Buildings		1,086.88	
Total Expenditures		5,077.06	
Credit Balance		1,654.63	$ 1,654.63
		6,731.69	

Student Loan Funds:

	Bal. Fr'wd	Receipts	Expend'rs	Balance
U. D. C. Loan Fund	$ 142.57	71.50	75.00	139.07
George Cherry Loan Fund	800.34	278.61	60.00	1,018.95
Sou. Railway Loan Fund	395.16	30.00	405.00	20.16
Clemson Student Loan Ass'n	105.00	1,135.00	1,235.00	5.00
John Bryce Baskine Loan Fund	00.00	60.00	60.00	00.00
Totals	1,443.07	1,575.11	1,835.00	1,183.18

Lost Ordnance Property (U. S.)

Credit Balance brought forward		$ 102.92	
Receipts		13.47	
		116.39	
Expenditures:			
G-7 Lost Equipment		54.75	
Credit Balance		61.64	$ 61.64
		116.39	

Civil Engineering Camp:			
Credit Balance brought forward	$ 17.55		
Receipts	204.50		
	222.05		
Expenditures:			
C-1 Food Supplies	153.91		
Credit Balance	68.14	$	68.14
	222.05		
New Residence—(W. W. Long)			
Credit Balance brought forward	$ 3,287.14		
Receipts	1,151.09		
	4,438.23		
Expenditures	0.00		
Credit Balance	4,438.23	$	4,438.23
Cottonseed Meal Research:			
Credit Balance brought forward	$ 78.87		
Receipts	0.00		
	78.87		
Expenditures:			
C-3 Feed & Veterinary Supplies	69.21		
Credit Balance	9.66	$	9.66
	78.87		
Y. M. C. A. Motion Pictures:			
Receipts	$ 429.00		
Expenditures:			
B-7 Contractural Services	422.85		
Credit Balance	6.15	$	6.15
	429.00		
Arnold R. Boyd Fund:			
Receipts	$ 20.00		

Expenditures:		
D-9 Contribution (Student Medals)	20.00	
Balance	0.00	$ 0.00
Four-H Club Camp:		
Receipts	$ 12.20	
Expenditures	0.00	
Credit Balance	12.20	$ 12.20
Net Credit Balance Revolving Accounts (See Exhibit J)		$ 57.528.21
Total Credit Balances	$ 73,549.84	
Less—Debit Balances	16,021.63	
	$ 57,528.21	

SMITH-LEVER EXTENSION FUND
EXHIBIT E

Receipts:		
Appropriations:		
Federal	$221,928.56	
State (July 1 to June 30)	270,567.41	$492,495.97
Balance, Overdraft June 30, 1931		1,253.88
		$493,749.85
Expenditures:		
A-1 Salaries:		
Director & Asst. Director	7,137.62	
State Supervising Agents	28,269.54	
Specialists	64,821.21	
County Agents	265,342.87	
Stenographers & Clerks	55,948.70	$421,519.94
A-2 Wages		679.10
B-1 Freight & Express		295.99
B-2 Travel		40,504.31
B-3 Communication Service		6,367.80
B-5 Publications		6,048.06
B-6 Heat, Light & Water		600.00
C-12 Supplies & Materials		8,641.12
D-2 Office Rent—For Agents		2,476.78
G-1 Furniture, Fixtures & Equipment		6,616.75
		$493,749.85

SOUTH CAROLINA EXPERIMENT STATION—FEDERAL FUNDS
(Hatch, Adams, Purnell Funds & Farm Products)
EXHIBIT F

Receipts:

Receipts from Treasurer of the United States as per appropriations for the fiscal year ended June 30, 1931:		
Hatch Fund	$ 15,000.00	
Adams Fund	15,000.00	
Purnell Fund	60,000.00	
Sales of Farm Produce	66,234.99	$156,234.99
Balance—Overdraft June 30, 1931		6,660.06
		$162,895.05

Expenditures:

Balance—Overdraft July 1, 1930			$ 13,117.62
A-1	Salaries	$ 53,650.19	
A-2	Wages	37,907.56	
B-1	Freight & Express	735.42	
B-2	Travel	3,904.65	
B-3	Telegraph & Telephone	660.63	
B-4	Repairs	2,985.04	
B-5	Publications	3,976.30	
B-6	Heat, Light, Power & Water	310.64	
B-7	Other Contractural Services	352.67	
C-2	Fuel Supplies	771.14	
C-3	Feed & Veterinary Supplies	18,955.43	
C-4	Office Supplies	1,378.79	
C-7	Refrigerating Supplies	106.70	
C-8	Educational Supplies	257.70	
C-9	Gasoline & Oil	3,125.49	
C-10	Fertilizer	3,400.47	
C-12	Other Supplies	4,914.76	
D-2	Rents—Lands	721.10	
D-4	Insurance	267.05	
D-10	Other Fixed Charges	25.00	
E-1	Contingencies	21.80	
G-1	Office Equipment	779.58	
G-4	Motor Vehicles & Equipment	86.05	
G-6	Livestock	2,388.89	
G-7	Educational Equipment	329.86	
G-8	Other Equipment	5,136.55	
H-2	Non-structural Improvements	268.84	
H-3	Buildings	2,359.13	149,777.43
			$162,895.05

SALARIES—S. C. EXPERIMENT STATION
(Paid from Hatch, Adams and Purnell Funds)
Schedule F-1

Director of Research	$ 4,725.00
Assistant Director of Research	149.94
Secretary & Treasurer	650.00
Head of Agronomy Division	400.00
Head of Farms Division	1,000.00
Head of Dairy Division	166.66
Station Chemist	1,800.00
Agricultural Economist	2,000.00
Home Economist	1,983.34
Bacteriologist	200.00
Botanist & Plant Pathologist	533.32
Associates:	
Home Economist	600.00
Dairyman	2,800.00
Animal Husbandman	2,666.66
Agronomist	3,000.00
Entomologist, 1 at 1,999.92; 1 at 2,187.50	4,187.42
Horticulturist	2,512.18
Plant Pathologist	3,200.00
Botanist & Plant Pathologist	600.00
Assistants:	
Agricultural Economists—2 at 1,000; 1 at 1,200; 1 at 1,800	5,000.00
Chemist	2,100.00
Agronomist—1 at 200.00; 1 at 976.66	1,176.66
Horticulturist	2,000.00
Plant Pathologist	1,200.00
Botanist & Laboratory Assistant	1,500.00
Librarian	1,300.00
Entomologist	149.94
Superintendent Coast Station	149.94
Superintendent Poultry Plant	166.66
Foreman of Farms	125.00
Foreman Experiment Station Farms	299.97
Secretary to Director	1,500.00
Clerk Agricultural Economics	1,320.00
Stenographers:	
Dairy Division	1,020.00
Horticulture	467.50
Agricultural Economics	1,080.00
Botany	320.00
	$ 53,650.19

AGRICULTURAL RESEARCH

(Reported by College Fiscal Year, paid through Office of Comptroller General of South Carolina)

EXHIBIT G

Appropriation:		
July 1, 1930—June 30, 1931		$ 68,631.36
Expenditures:		
A-1 Salaries	$ 35,249.40	
A-2 Wages	10,492.28	
B-2 Travel	4,275.93	
B-3 Telegraph & Telephone	365.45	
B-4 Repairs	606.65	
B-5 Printing & Advertising	1,011.06	
B-6 Water, Heat, Light & Power	568.98	
C-2 Fuel Supplies	28.00	
C-3 Feed & Veterinary Supplies	1,887.54	
C-4 Office Supplies	370.24	
C-9 Motor Vehicle Supplies	586.48	
C-10 Agricultural Supplies	7,902.07	
C-12 Other Supplies	910.79	
D-2 Rents	535.50	
G-1 Office Equipment	86.13	
G-4 Motor Vehicles & Equipment	2,667.00	
G-6 Live Stock	291.92	
G-8 Other Equipment	795.95	$ 68,631.36

SALARIES—AGRICULTURAL RESEARCH
(Year Ended June 30, 1931)

Schedule G-1

Assistant Director of Research	$ 2,650.01
Heads of Divisions:	
Animal Husbandry	1,050.00
Dairying	1,500.01
Entomology	1,200.00
Horticulture	1,266.67
Farms	2,400.00
Bacteriology	1,266.62
Agronomy	1,400.00
Agricultural Editor	1,150.00
Superintendents:	
Coast Station	2,650.01
Tobacco Experiment	2,800.00
Sand Hill Station	400.00
Pee Dee Station	3,600.00

Assistants:	
Research Assistants, 1 at 2,200; 1 at 1,346.09; 1 at $2,100	5,646.09
Horticulturist	400.00
Agronomist	400.00
A. R. Testing	1,200.00
Foreman Coast Station	1,200.00
Foreman Experiment Station	1,299.99
Foreman Sandhill Station	50.00
Foreman Farm	250.00
Dairy Herdsman	270.00
Stenographer	1,200.00
Total	$ 35.249.40

CROP PESTS AND DISEASES

(Reported by College Fiscal Year. Paid by Comptroller General of South Carolina)

EXHIBIT H

Appropriation:

Fiscal Year July 1, 1930—June 30, 1931	$ 11,349.96

Expenditures:

A-1	Salaries:		
	State Entomologist	$ 800.00	
	State Plant Pathologist	874.98	
	Asst. State Entomologist	2,449.98	
	Asst. State Pathologist	2,400.00	
	Clerks & Stenographer	1,170.00	7,694.96
A-2	Wages		480.00
B-1	Freight & Express		30.27
B-2	Travel		1,572.64
B-3	Telegraph & Telephone		34.57
B-5	Printing		314.00
C-9	Gasoline & Oil		165.83
C-12	Other Supplies		107.69
G-1	Office Equipment		250.00
G-4	Motor Vehicles		600.00
G-8	Other Equipment		100.00
			$ 11,349.96

LIVESTOCK SANITARY WORK

(Reported by College Fiscal Year. Paid by Comptroller General of South Carolina)

EXHIBIT I

Appropriation:		
Fiscal Year July 1, 1930—June 30, 1931		$ 65,752.72
Expenditures:		
A-1	Salaries (See Schedule I-1)	47,920.02
A-2	Wages	120.00
A-3	Special Payments	2,963.25
B-2	Travel	11,750.51
B-3	Telegraph & Telephone	240.13
C-4	Office Supplies	186.62
C-12	Other Supplies	1,407.74
D-9	Contributions	684.80
G-1	Office Equipment	63.50
G-8	Other Equipment	416.15
		$ 65,752.72

SALARIES—LIVESTOCK SANITARY WORK

Year Ended June 30, 1931

SCHEDULE I-1

State Veterinarian			$ 2,300.00
Assistant Veterinarians:			
1 at $3,200.00	$ 3,200.00		
5 at 2,800.01	14,000.05		
1 at 2,400.00	2,400.00		
2 at 2,300.00	4,600.00		
2 at 2,200.01	4,400.02		
1 at 1,833.34	1,833.34		
1 at 319.44	319.44		30,752.85
Assistants to Veterinarians:			
3 at 1,800.00	5,400.00		
2 at 1,620.00	3,240.00		
1 at 1,323.00	1,323.00		
5 at aggregate	1,156.67		11,119.67
Clerk			2,300.00
Stenographer			1,447.50
Total			$ 47,920.02

GENERAL CASH ACCOUNT

EXHIBIT J

Account	Exhibit	Amount	Total
Cash Balances to Acocunt for:			
Collegiate Activity Funds	A	$111,771.71	
Cadet Fund	B	20,143.52	
Student Banking Account	C	2,045.63	
Revolving & Trust Funds	D	57,528.21	$191,489.07
Less Overdrafts:			
Smith-Lever Extension Fund	E	1,253.88	
South Carolina Experiment Station	F	6,660.06	7,913.94
Net Cash Balance to Account for			$183,575.13
Cash Accounted for as Follows:			
Cash on Hand and in Banks:			
Cash in office, Student Banking Account			$ 2,045.63
Cash on Deposit:			
South Carolina National Bank, Geenville:			
College Funds	$ 50,813.48		
Smith-Lever Funds	2,392.84	$ 53,206.32	
S. C. Savings Bank, Anderson:			
College Funds		36,954.38	
Carolina National Bank, Anderson:			
Smith-Lever Funds	1,000.00		
College Account No. 1	60,600.00		
College, Checking Account Account No. 2	16,277.49	77,877.49	
Peoples State Bank, Anderson:			
College Funds		35,000.00	
Peoples State Bank, Clemson College:			
Smith-Lever Funds		10,499.43	
Total Cashier's Certificates			$213,537.62
Less Checks Outstanding		32,008.12	
*Treasurer's Bank Balances		181,529.50	$181,529.50
Total Cash—As Accounted for			$183,575.13

*NOTE: All bank deposits are amply protected by securities in the hands of the College Treasurer.

REPORT OF DIRECTOR OF EXTENSION

Dr. E. W. Sikes, President
The Clemson Agricultural College
Clemson College, South Carolina

Dear Dr. Sikes:

The report of Extension work for the year ending June 30, 1931, is given below:

GENERAL STATEMENT

The state-wide county agents law which became effective January 1, 1930, providing a farm agent and a home agent for every county has been in effect this year. We believe that with a farm and a home agent in each county better results have been obtained throughout the state.

We have continued to cooperate with the Federal Farm Board in its program of improving agricultural conditions. In cooperation with the Farm Board and leading tobacco growers assistance was given in the development of the new Cooperative Tobacco Growers' Association with headquarters at Florence, South Carolina.

We have cooperated with the Farm Board and the officials of the South Carolina Cotton Growers' Cooperative Association during the reorganization period of 1930. Our agents cooperated with the cotton association in arranging meetings of farmers in September and October for the purpose of acquainting them with the details of the new cotton cooperative set-up.

We have cooperated with the Farm Board in making a survey of grain marketing in the coastal plains area of South Carolina.

We have continued our contact in cooperative work with the Sweet Potato Growers' Association, Peach Growers' Association and Asparagus growers.

We are cooperating with the State Bankers' Association, groups of banks and individual banks, in efforts to work out a sound basis for agricultural credit. There is a general feeling on the part of all concerned that credit should be upon a basis more conducive to the development of a sound agricultural program. The adjustment from credit on one crop to credit on a farm business of a more diversified and self-sustaining nature is of necessity slow but with the bankers taking the attitude that they now do the movement to a sound agricultural program will be hastened.

The South Carolina Natural Resources Commission has called upon the Director of the Extension Service for advice and assistance in carrying on its program. The Director met with the Commission and on several occasions called in specialists to discuss for the benefit of the Commission technical matters connected with canning and marketing.

In many of the towns of the state the unemployment situation became acute during the latter part of 1930. The Governor called upon the county farm and home demonstration agents to assist in the organization of county unemployment committees. This service was rendered promptly and with the utmost satisfaction.

The Extension Service has promoted the organization of Livestock Loan Companies to take advantage of the Federal funds made available to be used for loans to individuals to purchase stock in such organizations to the end that worth while livestock projects might be more adequately financed.

We this year as last have worked with the Federal Seed Loan office in its work of distributing Federal loan funds to farmers who could not otherwise obtain credit upon which to proceed with farming operations this year. This work took a great deal of the agents' time during several weeks in spring but under the circumstances we feel it was time well spent.

ADMINISTRATION

There were in South Carolina last year 46 white farm demonstration agents, five assistant agents, three district agents, 17 full-time and three part-time specialists, a state and two assistant state boys' club agents, and an editor and assitant editor. As has been the case in previous years all the Extension staff are not located at Clemson College. The headquarters of the director, assistant director, boys' club agents and several specialists are located at the College. Due to lack of dwelling houses and office space at Clemson College and for other reasons the

headquarters of the remainder of the staff are located in other places in the state. The three men district agents are headquartered at Spartanburg, Aiken and Florence, respectively. Each of these offices serves as headquarters for two or more specialists.

The county agricultural program of work is prepared after a thorough study of the needs of the particular county and in the light of the existing agricultural situation and outlook. The county agents, district agents, specialists and the County Council of Agriculture, consisting of leading farmers and business men of the county, participate in the preparation of such a program. A thoughtfully planned program of work based upon the needs of the situation and which sets up the particular objective to work toward and clearly defines the responsibility of the different agents enables the several agencies to cooperate in and coordinate the efforts and respective lines of work to the end that the total efforts are more efficiently utilized and the accomplishments more substantial. In counties where there are both white and negro agents the two agents have in the large a common program, even though in general they work with different classes of individuals.

In the general plan of work the county agent is in a sense the man on the firing line. He gains first hand information relative to the conditions, problems and needs of a county and therefore has a major part in the preparation of the county program of work. Through him the specialists make the necessary contacts with demonstrators and supervise the demonstrations. The county agent has to be well trained and possess a high degree of ability and a fund of accurate and detailed information in order to meet successfully the wide variety of demands made upon him.

It is the function of the specialists to keep up in detail with the developments in his particular field, separate the relevant from the irrevelant and pass the pertinent material on to the county agents, who in turn passes it to the farmers of his county. The specialists prepare their own state plans of work, assist in the preparation of the county programs, draw up detailed plans for definite demonstrations, through the county agents supervise the demonstrations, analyze and interpret the results of the demonstrations for the benefit of the farmers and county agents and make use of the results in the preparation of programs in the future.

The district agents visit regularly the county agents in their districts, inspect and offer helpful suggestions relative to demonstrations, aid in coordinating the work of the different agencies, assist new agents in getting started and aid in the preparation of the programs of work in the counties under their direction.

As a means of increasing effectiveness of Extension work the Extension Service continued the plan started several years ago of organizing definite and specific demonstrations in the various lines of work and have insisted that records be kept of these demonstrations. The major lines of Extension work this year have been those dealing with the agricultural outlook, farm enterprises and compare farm accounts, surveys of some successful landlord-tenant arrangements, economic practices in the production of several field crops and soil building, the best practices relative to hog feeding and herd and flock management of the various classes of livestock, herd improvement and management of dairy cows, the handling of home and commerical orchards, home and market gardens, poultry management in its several phases, control of plant diseases and insects, the many problems having to do with farm engineering. In addition to the work having to do with the production of the several agricultural commodities, much attention has been given to marketing poultry products, hogs, beef cattle, sheep and lambs, dairy cows and dairy products and the several classes of farm crops, fruits and vegetables.

In addition to the work with adults an important part of the program has been the work with boys and girls through 4-H clubs. Boys' club demonstrations include the several classes of livestock, poultry and garden and orchard crops. The enrollment of individuals and the number of demonstrations have for each of the past several years shown increases over the previous years. Greater emphasis is being placed upon the development of leadership for the local clubs.

ANIMAL HUSBANDRY

Animal husbandry work covers extension activities with beef cattle, swine and sheep.

Beef Cattle: With the increase of land drawn out of cultivation there is apparently an increase of interest in beef cattle. The beef cattle breeders in the state have not been able to supply the demand for beef bulls. Some bulls have been shipped into the state. Altogether probably 75 to 100 purebred bulls have been placed during the year. At the same time a number of beef heifers have been placed with breeders.

Swine: The hog feeding demonstration work carried on in 1928 and 1929 was continued in 1930. The growth of this work has been such that extension specialists and county agents have been unable to get records on more than a small per cent of the hogs fattened by this method. It has been the policy of the agents to secure records from the new feeders. The number of hogs on which records were kept increased from 1,474 in 1929 to 2,066 in 1930. The total gains on these hogs were increased from 116,405 pounds in 1929 to 199,714 pounds in 1930. A conservative estimate will place the number of hogs fed

by demonstration method in 1930 at twice the number fed in 1929. The records of 1930 show that 5.32 bushels of corn and 25.8 pounds of protein supplement were required for each 100 pounds gained by the hogs. Each bushel of corn fed returned a value of $1.65 to the farmer.

The demonstration method of feeding is teaching farmers that corn can be profitably grown and fed to hogs in South Carolina. Carefully kept records have made believers out of many skeptics. This method of feeding is also teaching them the value of better methods of feeding, management, and sanitation.

Cholera and worm treatment or prevention is becoming more generally recognized as necessary to successful hog production in this state.

The improvement in the quality and quantity of South Carolina hogs is shown by the attitude of the largest packing company in this state. This company has generally shown little interest in buying local hogs because the breeding and finish were poor. During the past year they have recognized the superior value of demonstration fed hogs and have purchased a great many of them.

Out of the total of 67 entries in the South Carolina ton litter contest, 31 completed the 180-day feeding period and turned in records both as to feed and final weight. New high records were set for the state in total weight for the litter and in average weight per pig. Bryan Howell of Barnwell County grew out 12 pigs to a weight of 3,624 pounds, an average of 302 pounds per pig.

Extension workers have been able to assist farmers in making cooperative shipments more and more each year. In 1930 280 cars of hogs were shipped by 2,523 farmers and included 26,834 hogs weighing 3,090,066 pounds, and returning $435,054.37 net to the growers.

Sheep: The low price of wool and lambs is slowing down development of the sheep industry in this state, although many growers are still improving the quality of their flocks. Four car loads of spring lambs were shipped by 30 growers in 1930. All shipments were made cooperatively among the growers who were brought together for that purpose by the county agents.

DAIRYING

The lines of dairy work carried on in counties consisted of the following:

N. 1.	(a)	Placing individually or group owned bulls.
	(b)	County-wide bull campaign.
	(c)	Auction sale of bulls.
No. 2		Dairy Calf Club.
No. 3		Dairy herd improvement association.
No. 4	(a)	Dairy herd record demonstratoin with owner herds.
	(b)	Dairy herd record demonstration with tenant herds.
No. 5		Miscellaneous dairy work.

Introduction of better sires by the above mentioned methods was one of the important activities of the year. Seventy-five bulls of good breeding were placed through auction sales. In addition to the bulls placed by auction sales there were 20 Jersey bulls and 33 Guernsey bulls placed with individuals by bringing them in direct communication with the breeders. Records were secured from the owners of 29 pure-bred bulls which showed that they sired 1,018 calves. The value of the heifer calves, constituting about one-half the total, would be increased easily by $10.00 a head over the value of common calves. This would mean that these 29 bulls alone were the means of adding $5,090.00 to the wealth of the community or the average of $175.50 per bull, as a result of one year's breeding.

Dairy herd records were kept by 14 dairy farm demonstrators during the year.

As a means of promoting the dairy business on a sound basis and at the same time giving boys on the farm experience in the practical handling of dairy problems boys' 4-H dairy calf clubs were organized and in operation in about 25 counties of the state.

Two dairy improvement associations were in operation in 1930—one in the coastal plains and one in the Piedmont. In the association of the Piedmont section there were 24 herds which produced a total of 2,577,680 pounds of milk. The gross returns were $154,148.38. The total feed cost was $57,538.70. The difference between the value of products obtained and the feed cost was $96,609.68, or $198.56 per cow per year.

A great deal of miscellaneous work in dairying was done by the county agents and specialists in helping farmers with plans for barns, milk houses, silos, purchasing cattle, sales of young stock. etc.

Work carried on in cooperation with the Bureau of Dairying of the United States Department of Agriculture with the seven active creameries in the state which made a total of 428,000 pounds of butter during 1930, deserves special mention. This work was with those things having to do with the production of better quality butter. As a result of this work a decided improvement in the quality of butter made in these creameries was shown. In September there was a south-wide butter contest held in Nashville, Tennessee, and the creamery located at Newberry won the medal for the quality of its butter in this contest

Several county agents have started cream stations in their respective counties for assembling cream from the farmers to be shipped to some nearby creamery.

There was established at Greenwood during the year a cheese factory operated by the Kraft-Phoenix Cheese Company. The extension workers have done a large amount of educational work in Greenwood and adjoining counties among the farmers with the view of helping them to avail themselves of a market to increase their incomes. The cheese factory opened in June with about 1,700 pounds of milk per day and by December it was receiving 9,000 pounds per day.

AGRONOMY

Work in this project was organized under the following headings:

Cotton Production:
- Cotton Contest
- Fertilization and Seed Improvement Work

Production of Food and Feed Crops:
- Corn Contest
- Pasture Work
- Forage Crop Production

Soil Building Rotation Demonstrations
Tobacco Production
Peanut Production
Summer and Winter Soil Building Crops

Cotton Contest: The cotton contest in 1930 was in its fifth year. The purpose of this contest is to improve the lint of cotton in South Carolina and to reduce the cost of production per unit by economically increasing the yield per acre. Both of these purposes have been realized to a considerable extent during the past several years. During the last 10 years the trend in total acres of cotton in cultivation has been downward but the total bales produced has been upward. According to the best evidence we have about 20 per cent of the cotton crop of South Carolina five years ago was of intermediate lengths (15/16 to 1-1/16 inches). This is the range of staples most needed by cotton mills in the Carolina territory. According to the report of the Bureau of Agricultural Economics for 1930, approximately 50 per cent of the 1930 crop was of the intermediate staple lengths. This change has been due largely to the accumulated effect of the cotton contest with its large number of five-acre fields over the state and the dissemination of good seed from these fields. The value of the cotton crop in 1930, because of this large increase in staple quality, is about $1,166,000.00 greater than it would have been had the crop included only 20 per cent of intermediate staples.

Fertilizer and Seed Improvement: The principal activities of this work were the home mixing and cooperative purchasing of fertilizer materials. This is a very important matter as the state uses annually 750 to 800 thousand tons of fertilizer, costing 20 to 25 million dollars. This is more important now than in former years due to the increase in the number of sources of fertilizer elements. In a number of counties farmers made cooperative purchases in carlots at considerable saving.

Corn Contest: Corn is the second corp of importance grown in South Carolina both from the standpoint of acreage and value. The state, however, is still a deficit area with respect to corn. The chief problems connected with the production of this crop is to secure larger yields per acre and to reduce the cost per bushel. In order to increase yields per acre and to promote that phase of organization which would naturally follow, a state-wide contest was organized in 1929 and was conducted

again in 1930. In 1930 there were 766 contestants enrolled in the contest, each wth five acres of corn in a demonstration and 474 records were received. This compares with 494 contestants in 1929 with 270 records received. The contestants' figures on yields are not accepted but averages made by a state committee of extension workers are used instead. Each of the three state winners in 1930 made over 100 bushels per acre and each of the 12 district winners made over 400 bushels on their five-acre fields. A negro tenant farmer was among the winners in 1930, with a yield of 422 bushels on five acres.

Pasture Work: With the decrease in the number of acres in cultivation in the state and the increase of land available for farming in certain areas an acute problem of land utilization is created. A considerable part of this land is suitable for permanent pastures and in carpet grass, lespedeza and Bermuda grass we have pasture plants admirably suitable for livestock production. County agents and agronomy specalists have promoted the use of these pasture crops through meetings, bulletins, circular letters and otherwise. It is very difficult to obtain accurate records of permanent pastures due to the fact that they constitute only a part of the feed for livestock, but we know that a large increase is being secured, especially in carpet grass and lespedeza pasturage.

Soil Building Rotation Demonstrations: One hundred and ten five-acre two-year soil improvement rotation demonstrations were conducted this year. In these demnstrations the farmers were furnished the fertilizer materials for home mixing the fertilizer. The amount of fertilizer per acre is for cotton 64 pounds phosphoric acid, 36 pounds ammonia and 25 pounds potash, for corn only 26 pounds of ammonia per acre is furnished. The farmers agree to grow the crop according to instructions of the Extension Service and to keep records on all costs and returns. The rotation is, first year, cotton followed by Austrian peas; second year, corn with soybeans followed by Austrian peas, and then back to cotton. Varieties planted, fertilization, spacing and insect control must be according to instructions. These demonstrations have been effective in making more popular home mixing of fertilizers, the use of soybeans and Austrian peas, improved varieties of cotton, close spacing and boll weevil control. Some excellent results in soil building have been obtained in the plots started in 1928.

Tobacco Production: For the first time the Extension Service outlined and conducted careful tobacco production demonstrations, carrying the crop from seed treatment before planting through the sales of the

cured tobacco. Ten of these demonstrations were conducted in the tobacco growing counties. Through the cooperation of the Chilean Nitrate of Soda Educational Bureau, which furnished part of the fertilizer, the county agents were in a position to select capable tobacco farmers for these demonstrations and require them to carry out instructions. Some very marked results were obtained from these demonstrations.

General: The remainder of the work in agronomy was of a more general character, some of it not being adapted to contest methods. In such matters as the promotion of the planting of summer legumes and such winter legumes as vetch, Austrian and field peas, a great deal of work is being done. The acreage of these crops is contsantly increasing.

HORTICULTURE

Demonstration work in horticulture is divided into five sub-projects as follows:

1. Home Orchards
2. Commercial Orchards
3. Home Gardening
4. Truck and Commercial Gardening
5 Special Crops

Home Orchards: The purpose of the home orchard work is to increase the number of small well kept orchards to supply very necessary type of food stuffs for farm families A number of demonstration orchards were located and complete records were kept by the owners during the year. Every possible use was made of these demonstrations to encourage farmers in the surrounding territory to follow the example set by the demonstrators. They were included in tours; demonstration meetings were held at the orchards at the time of spraying and pruning, and at other times.

Commercial Orchards: The purpose of our commercial orchard extension work is to help growers develop effective and economical methods of production and marketing. A number of result demonstrations were arranged at the beginning of 1930 under the supervision of the county agents and specialists. The orchard owners or demonstrators were furnished regularly with complete instructions in all phases of management and were required to keep complete records of their work, expenditures and receipts on forms furnished for that purpose. Meetings were held during the year at these orchards and all growers of the surrounding territory were invited to come and bring their farm labor to receive instructions in management and in actually doing the work required for efficient production.

Extension work in aiding commercial peach growers was started in 1920 at which time only 20 car loads of peaches were being shipped from the state. Peach production in South Carolina has developed to the

point where in 1930 812 car loads of peaches were shipped. The Extension workers have been important factors in this development. In 1930 complete records were secured from 10 commercial peach orchard demonstrators which had a total of 27,000 trees. The gross returns from these orchards were $102,865.13, the total cost $28,489.19 and the net profits $74,365.94.

During the year four records were obtained from commercial growers of grapes, all in the Piedmont section. Records were obtained from four commercial apple growers in Oconee, Pickens, Spartanburg and Greenville counties. Detailed records were received from eight dewberry growers, with a total of approximately 23 acres producing 1,369 crates. The net profits from the 23 acres amounted to $3,196.13.

Home Vegetable Gardening: The demonstrations in home gardening were organized on the contest basis. This was made possible by contributions for prizes from the State Publishing Company of Columbia and others. The object is to increase the number of gardens and to encourage year-round gardening as a means of decreasing cash expenditures for foods and to improve the health, efficiency and welfare of farm people. Circular letters on gardening were sent regularly to each demonstrator. Altogether 5,110 farmers received this garden letter. Demonstrators mailed in records each month. In order to stimulate interest among all classes of farmers the contestants were divided into four groups as follows: Home gardeners, small market gardeners, market gardeners, and tenant farmers only. The gardeners were visited and records checked, special emphasis being placed on fall and winter gardens. We received 312 records from the first group. In this group with average size plots of .46 acre, fresh vegetables were served to the average family of five 1,018 times. The average surplus canned was 113.6 quarts and the average cash sales were $29.14 per gardener.

We received 74 complete records from the small market gardeners group. The average acreage of gardens in this group was .88 of an acre and fresh vegetables were furnished to six members of the average family 1,436 times. A surplus of 195 quarts were canned and the average cash sales were $195.78.

In the market gardeners class 12 complete records were received. The average acreage in cultivation was 5.4 acres and vegetables were served to the average family of seven 1,462 times. The canning of surpluses was 4,292 quarts and average cash income $1,248.80.

Due to changes in the personnel of the horticultural specialists the demonstration work in truck gardening is not well organized on the basis of securing records. Most of the work with this class has been of a more general nature.

Special Crops: Under this sub-project the principal activities were in connection with the sweet potato contest. The South Carolina Sweet Potato Growers' Association made available $600.00 in prize money for use in connection with these demonstrations. Each demonstration consisted of one acre of potatoes and the results were such as to promote a large production of potatoes that would grade U. S. No. 1's. A total of 504 farmers were enrolled at the beginning of 1930 and 209 complete records were obtained by the end of the year. Thirty-three counties out of 46 had one or more sweet potato demonstrations. The average yield of the 209 demonstrations from which records were received was 117.8 bushels of U. S. No. 1's and a total of 207 bushels. The average value per acre amounted to $121.70, the cost of production $44.95, leaving a profit of $76.12 per acre. As this contest continues from year to year certain factors making for success in production of this crop such as spacing, time of planting, time of harvesting, fertilization, etc. are being worked out under practical farm conditions. Considering the potential value of the sweet potato crop in South Carolina, we feel that the sweet potato work is very important.

POULTRY

The production of poultry as a source of cash income in South Carolina has been growing for a number of years. This movement has been stimulated by the development of carlot shipments of poultry, by the improvement of local markets and by the effect of the cotton boll weevil on cotton farming.

Our aim in poultry extension work is to encourage all farmers to grow at least sufficient quantities of poultry and eggs to meet their home needs and in the case of those who can profitably do so to develop poultry production as a source of cash income.

The principal demonstrations conducted in poultry in 1930 were in connection with the farm flock and the 4-H club work. At the beginning of 1930 171 demonstration poultry flocks were listed by the county agents and specialists. From this group 132 complete records were secured during the year. In addition to the above 60 other demonstrations in egg calendar flock records were started from which 35 complete records were received. The production of healthy chicks is quite an important enterprise in this state. Fifty-seven demonstrators completed records for the year in this phase of poultry production. The farm flock demonstrators from whom the 132 records were received had a total of 21,863 hens, or an average of 166 per farm. The average number of eggs produced per hen was 146, compared with about 55 as a state average. The average receipts per hen was $6.16, feed cost per hen was $3.06 and other costs 83 cents, not including labor. The average labor income from the demonstration flock was $374.17, or $2.25 per hen. These results are in line with results obtained in previous years.

In 1930 there were 554 boys and 78 girls enrolled in poultry club work. They had a total of 9,781 chickens.

Ten poultry associations were organized in different counties with a membership of 1,617.

A monthly poultry letter summarizing the results of the previous month's work by the poultry demonstrators is issued and goes to all poultry demonstrators and any others requesting it. There is a very material improvement in the class of poultry produced in the state compared with the poultry population of a few years ago.

MARKETING

The service rendered by the extension workers in the field of marketing is probably not as well understood as the assistance given in other lines. This is due to the fact that all people do not have the same idea as to what marketing is. To many people successful marketing service means getting a price higher than individuals will be able to get for themselves; to others it means disposing of farm products at the going market prices but without the necessity of grading and packing in a standard way the products offered for sale.

To extension workers the job of marketing cannot be separated from that of production. In a broad sense marketing actually begins before production commences. Plans must be made before the crop is planted to have the right variety, the product coming on at the proper time, and in such amounts as can be disposed of profitably. It can be readily seen that it is a very superficial view of marketing to consider it as beginning after the commodity is delivered to the shipping point. The best any human agency can do at that time is to secure the best market price for the particular quality product delivered. It is to be remembered that no association or any other organization can make a price and maintain it very long out of line with the price determined by supply and demand factors.

Plan of Marketing Work: The plan of marketing work contemplates marketing activities by all farm and home demonstration agents under the general leadership of the Division of Markets. Some features of marketing work such as shipping point inspection are supervised directly by the chief of the Division of Markets, while other features are handled by the county agents more or less independently.

The general policy is to develop marketing facilities under the control of growers in all cases where satisfactory facilities are not already provided in some other way. A great deal of the marketing work is not performed by any organized association of farmers but is handled by groups of farmers who are brought together for that specific purpose

through the influence of the county agents, and who disband immediately after a particular marketing job is finished. However, a number of associations have been developed or are in process of development for the handling of most kinds of products grown in this state. Extension workers can and have rendered a great deal of assistance in the matter of providing marketing facilities that enable the growers to get the best price the market affords and in keeping markets open to the flow of commodities from South Carolina farmers to the consuming centers.

Tobacco: A tobacco marketing association was organized during the year, the cooperating agencies being the leading tobacco growers, the Extension Service and the Federal Farm Board. The Extension Service loaned District Agent J. T. Lazar temporarily to the new Tobacco Association to help set up the organization and get it under way. He was, of course, on leave without pay from the Extension Service during this period. The business of the first year seems to have been quite satisfactory.

In connection with our service to tobacco growers there was operated a tobacco grading service in cooperation with the Bureau of Agricultural Economics. A total of about 17 million pounds was graded for the South Carolina Tobacco Marketing Association. A large number of grading demonstrations were made for the benefit of individual growers. An interstate committee on cured tobacco has been set up and on this committee are the directors of Extension of Virginia, North Carolina and South Carolina. The work of this committee is directed to the end of coordinating efforts made in the three states in such matters as marketing and production credit plans for tobacco growers. One full-time man has been employed to handle the field work of this interstate committee. This work is in cooperation with the Extension Service of the United States Department of Agriculture.

Standardization, Harvesting, Grading, Packing, Loading: The Extension workers gave a great many demonstrations in various phases of standardizing, harvesting, grading, loading, etc. Special attention was given to our leading fruit and truck crops such as beans, peas, asparagus, Irish potatoes and sweet potatoes. Many demonstrations were given with respect to time, method, system of harvesting, attactive packing, grading for uniform quality, the use of standard containers, proper methods of loading cars, and methods of refrigeration, curing and storing.

Federal-State Shipping Point Inspection: In this line of work inspection services were rendered with the crops mentioned above. The following is a report on car load shipments under the supervision of the marketing specialists:

	Amount	Value	
		Per Unit	Total
Asparagus	520 cars	$1,445 per car	$ 751,400
Peaches	592 cars	825 per car	488,400
Irish Potatoes	1,928 cars	830 per car	1,600,240
Cabbage	600 cars	450 per car	270,000
Beans	57 cars	1,050 per car	54,850
Green Peas	13 cars	850 per car	11,050
Cucumbers	98 cars	550 per car	53,900
Sweet Potatoes	210 cars	430 per car	90,300
Peanuts	12 cars	1,200 per car	14,400
Totals	4,030 cars		$3,334.540

General Marketing Services: The marketing work of a general nature does not permit showing results in figures to any great extent, however, much service was rendered in such matter as bringing sellers and buyers together, informing growers relative to the existing selling facilities, encouraging cooperation, giving out information as to market prices, making surveys of quantities produced on given areas as a basis for marketing enterprises, cooperating with state and national agencies and furnishing information regarding them to growers, furnishing to growers lists of supply dealers and advising shippers with reference to the best outlets for commodities.

Cooperative Marketing and Similar Organizations: During the year three new cooperative associations were organized with the assistance of the Extension Service: The tobacco marketing association, the South Carolina Pecan Growers' Association, and the South Carolina Packing Corporation.

Poultry and Egg Marketing: Poultry and egg marketing services which the Extension Service undertakes to render are quite difficult in view of the fact that the producers are widely scattered and very few of them are particularly interested in this enterprise except in a small way. The poultry marketing service, however, is reaching a great many people. There were 21,396 different assignments made by individual producers to car load shipments of poultry during the year 1930. The total tonnage amounted to nearly one million pounds. Forty-four counties were represented in the shipments made during the year.

A plan of cooperative egg marketing was worked out during the year. The county and home agents supervised the counting and grading, furnished market information to local managers, or received the eggs and prepared them for the market. Sales in this manner amounted to 510 cases. The agents also assisted producers in shipping eggs by express or through egg associations. The total value of eggs shipped by these means amounted to about $12,000.00.

ENTOMOLOGY

Most of the Extension work with insect pests and plant diseases during 1930 was of an emergency character. The nature of the work with insects and plant diseases is such that method demonstrations will probably always be the most important means of disseminating knowledge and improving practices with respect to identifying and controlling these pests. During the year 269 specimens were examined and determination made as to what was causing the damage and advice given relative to control measures.

The demands for our specialist in connection with insect and plant disease work are so numerous that he is kept in the field a large part of the time.

Beekeeping: This work is carried on in most of the counties of the state. There has been a gradual increase in the number of modern loose frame hives substituted for the old fashioned box or log hives.

AGRICULTURAL ENGINEERING

The demands for assistance on the part of the Extension Service from the farmers along agricultural engineering lines are becoming more insistent each year. Perhaps the greatest interest at present lies in the possibilities of reducing production costs through the use of more and better equipment. The low productivity per farm worker makes it impossible to support an adequate standard of living on a very large number of farms in this state. Some definite demonstrations based on the use of power farming equipment designed to point the way to larger income per farm worker have been organized. Results secured so far in these demonstrations have been very satisfactory.

In 1930 there were five two-horse machinery demonstrations in cotton production. The average cost of producing a pound of lint cotton on these demonstrations was eight cents. There were 13 power machinery demonstrations in cotton production. The average cost of producing a pound of lint cotton on these demonstrations was 7.39 cents. Seventeen power machinery demonstrations in corn production were carried on during the year. The average cost of producing a bushel of corn on these demonstrations was 44 cents. There were two power machinery demonstrations in soybean production. On these demonstrations the average cost per bushel was $1.19.

During 1930 there were 32 grain combines in operation in this state. Nineteen of these machines saw service in the matter of harvesting soybeans, thus giving double use in helping to meet the overhead cost involved in the cost of this equipment. The system of harvesting with the combines should have some effect in changing the type of farming on many farms as the soybean crop can be made to follow the small grain crop on the same land. Most of the grain combines have been purchased by farmers in the upper coastal plains area.

The demands for assistance with the planning of farm buildings have been more than we have been able to meet. To help meet this situation an assistant farm engineer was employed March 1, 1931. Sixty-three plans were ordered from the United States Department of Agriculture for use in this state.

In view of the fact that many of our county farm agents did not have training in college in agricultural engineering, two five-day farm machinery schools were arranged for the agents. In these schools they were taught to use and adjust two-horse cultivators, tractors, and other types of machinery adaptable to our conditions.

The use of two-horse farm machinery is increasing rapidly in this state. We are finding that the type of farmer who takes most readily to two-horse equipment is the farm owner who operates a family size farm and who does a great part of his own owrk. There are, however, a number of larger farmers who are taking the trouble to train their labor in the use of better equipment.

The reports of the county agents show that a variety of activities could be classed under the heading of agricultural engineering. The following indicates the extent of these activities:

Demonstration	Number
Soil Erosion	232
Land Clearing	71
Drainage and Irrigation	27
Two-horse Machinery	30
Power Machinery	20
Water Systems	15
Sewage Disposal Systems	13
Farm Building Plans	573

AGRICULTURAL ECONOMICS

A division of agricultural economics was created in the Extension Service by action of the Board of Trustees of Clemson College on June 20, 1930. Mr. D. W. Watkins, assistant director, was made chief of this new division and an extension economist to have charge of the farm management extension work was employed, beginning August 1, 1930. The creation of the Federal Farm Board and the expressed intention on its part of working through existing agencies as far as possibel is one of the reasons for enlarging extension work in economics. The whole agricultural problem needs to be regarded more than has been customary from the economic viewpoint. It is necessary to provide a special channel for taking to the county agents and to the farmers the results of the large amount of research along economic lines.

The processes of farm readjustment now under way are largely to be directed in keeping with the new information available on farm organization and management, cooperative marketing, the changing agricultural outlook, changing demand on the part of consumers and new sources of supply.

The work in agricultural economics thus far has consisted in a large measure in disseminating outlook information and making plans.

During the spring of 1931 about 100 demonstrations in farm enterprise record keeping were started and about 12 demonstrations in complete farm records were got under way. Enterprise record books for use with crop and livestock enterprises were prepared during the early part of 1931.

Following the southern outlook conference, which was attended by members of the extension agricultural economics division, last fall a state outlook conference was held and the chairman of the agricultural committee of the South Carolina Bankers' Association, business men, master farmers, representatives of the Federal Farm Board and others were present assisting with the discussions and in the conclusions. A state-wide farm program was formulated and was offered as suggesting sound farming practices in the light of the outlook. A series of seven regional outlook meetings was then arranged over the state and were attended by county agents, bankers, leading farmers and business men. These in turn were followed by county and community meetings. In many of these meetings the outlook was discussed by members of this division.

During the winter of 1930-31 a state outlook report was prepared. In order to aid in applying the outlook to specific farms a circular on planning the farm was prepared. During the year an average of about one article per week dealing with the outlook relative to some farm enterprise has been prepared.

During September and October, 1930, members of this division attended many of the county meetings called for the purpose of explaining the projected plans of the American Cotton Cooperative Association and the relation of the Federal Farm Board and the new cotton marketing set-up.

BOYS' 4-H CLUB WORK

The following table shows the different sub-divisions or types of work carried on under this project and also shows the amount of work planned at the beginning of the year and the amount completed by the end of the year upon which different records are available:

	Number proposed	Number accomplished
Organized Clubs	238	264
Local Leaders	210	282
Members	4,231	4,910
Demonstrations	4,361	5,534
Camps	45	32
Judging Teams	43	48
Rally Days	37	16
Club Shows	29	21
Exhibits at State Fair	426	646

Club work has had a steady growth in South Carolina for the past 10 years. This we feel is due to the realization that membership in boys' clubs is beneficial to the boys and to the communities and homes in which they live. The work is conducted almost entirely through organized community clubs. These clubs have their own elected officers and whenever possible some adult in the community serves as club leader or counselor.

During 1930 there were organized 264 separate community boys' 4-H clubs. There was a total membership in club work of 4,910. Some of the boys had more than one demonstration, there being a total of 5,536 demonstrations. Complete records were received from 2,820 members. The following table shows the number of demonstrations completed by counties and profits received on these demonstrations:

County	Demonstrations Completed	Profits on Demonstrations
Abbeville	101	$2,318.48
Aiken	118	1,762.60
Allendale	19	174.95
Anderson	370	8,087.28
Bamberg	49	710.26
Barnwell	17	356.90
Beaufort	16	390.42
Berkeley	29	974.39
Calhoun	9	138.63
Charleston	18	696.33
Cherokee	61	821.54
Chester	16	892.80
Chesterfield	39	1,443.14
Clarendon	19	244.80
Colleton	26	312.46
Darlington	39	508.23
Dillon	53	1,693.16
Dorchester	13	597.11
Edgefield	15	293.75
Fairfield	116	2,927.67
Florence	83	3,200.84
Georgetown	15	231.60
Greenville	199	5,734.21
Greenwood	51	1,463.90
Hampton	---	-,---.--
Horry	17	173.45
Jasper	28	1,029.58
Kershaw	15	175.22
Lancaster	13	477.96

Laurens	43	835.79
Lee	42	1,243.33
Lexington	18	301.18
Marion	94	1,608.12
Marlboro	37	661.27
McCormick	78	1,199.03
Newberry	117	5,105.37
Oconee	90	2,100.80
Orangeburg	80	2,290.37
Pickens	236	4,472.82
Richland	39	3,087.79
Saluda	25	3,828.00
Spartanburg	236	6,474.63
Sumter	10	185.31
Union	16	461.14
Williamsburg	34	703.71
York	61	1,085.70
Totals	2,820	$73,476.02

The above work does not include the work of the members of the negro boys' 4-H clubs nor the girls' 4-H clubs.

PUBLICATIONS

(a) Extension Bulletins which contain scientific information in fairly complete and popular form and designed to be used by farm people in their farm operation. There were issued four publications of this type last year.

(b) Extension Circulars which are usually short and applicable to a current year or condition but otherwise of the same general character as extension bulletins. Nine circulars were published last year.

(c) Information cards. A mailing card carrying printed information on one particular subject intended to be used in answering common inquiries and for quick reference by farm people.

(d) The Weekly News Notes contains timely information of various kinds and is intended primarily as a clip sheet for newspapers within the state, but has a mailing list within and without the state of about 2,500. Fifty-two issues each containing 10 to 12 miscellaneous articles were made during the year.

(e) News Letters. Mimeographed form news sent directly to newspapers. During the year 145 of these were prepared.

In addition to the above publications there are (1) Carolina Club Boy published monthly and sent to members of boys' clubs; (2) The Garden Letter, a mimeographed monthly letter to garden demonstrators and others requesting it; (3) The Monthly Poultry Letter to poultry-

men; (4) Numerous letters issued at irregular intervals and sent to special groups of farmers by specialists; and (5) letters by county agents to farm people within the counties.

Due to the reduction of funds the position of assistant editor was discontinued July 1, 1931.

HOME DEMONSTRATION WORK

During 1930 a home demonstration agent was employed for each county. In addition to the 46 county home agents there were a state home demonstration agent, an assistant agent, three district agents, a Girls' Club agent and four specialists. This work is conducted as heretofore through Winthrop College and the headquarters are located at Winthrop. Inasmuch as a complete report is submitted from Winthrop College no report on this phase of extension work is made here.

NEGRO DEMONSTRATION WORK

The demonstration work with negroes insofar as it is conducted through negro agents is carried on directily through the State College at Orangeburg. The President of this college serves as a general supervisor with an assistant to serve as district agent to look after the details of supervision. There are 12 negro farm agents and district agent in charge and seven negro home agents with a supervising home agent. In most of the counties where there are negro agents the white agents advise and aid the negro agents with respect to planning and carrying through the work. The work conducted by the negro agents is mostly with negro land owners and tenants who have their own farm equipment. While the share croppers have the legal status of hired laborers and their farming plans largely made by the landlords in many cases the landlords are glad to have the negro agents work with their share croppers.

The negro agents are well trained and efficient and are rendering a real service to this large portion of our farm population. They make use of the same general methods of work as are used by white agents. As is the case with white agents, the negro agents work with boys and girls as well as adults. Most of the money for negro demonstration work is from Federal and State off-set funds and a small amount from county funds.

W. W. LONG, Director

REPORT OF BOARD OF VISITORS

To the Board of Trustees
Clemson Agricultural College
Clemson College, South Carolina

The Board of Visitors for the year 1931 begs leave to report: We assembled at the college at one o'clock May 6, 1931, and were entertained at the Trustee House where we enjoyed every comfort. Those present were:

Jas. E. Peurifoy, Walterboro, Hold over member 1930
Cleveland Sanders, Ritter, 1st Congressional District
G. B. Nicholson, Edgefield, 2nd Congressional District
Harold Major, Anderson, 3rd Congressional District
L. P. Hollis, Greenville, 4th Congressional District
Horace L. Tilghman, Marion, 6th Congressional District
R. Beverley Herbert, Columbia, 7th Congressional District

The board organized by electing R. Beverley Herbert, Chairman and Jas. E. Peurifoy, Secretary.

A splendid schedule was arranged and throughout the afternoon and during the next day, May 7th, we inspected every department of the college and during that evening heard an interesting talk by Dr. Sikes giving a history of the founding of the college and its continuous development.

We have read the report of the Board of Visitors for 1930 and do not feel that we could do better than to adopt that as our report for this year. We examined in detail the various departments and were greatly impressed with the good work and efficiency in every department. On account of the rain on the 7th the dress parade by the cadet corps had to be omitted. We were pleased, however, to note the soldierly bearing of the various companies at retreat and at all other formations that we were privileged to witness.

The buildings, grounds, farms and orchards are well kept and present a beautiful appearance at this season of the year.

On account of the lack of space work of the Research Departments is scattered and in some cases greatly cramped. As soon as practicable we recommend that an adequate agricultural building be constructed. We believe, however, that splendid work is now being done but that the improvements should be had as early as practicable.

We wish to commend particularly the splendid work being done by the Experimental Research Departments under Professor H. W. Barre and the Extension Department under Dr. W. W. Long. We feel that we can not commend too highly the value to the State of this work and to recommend their continued development and the increasing support of the people of the entire State. In view of the imperative need for further diversification of crops, we earnestly recommend the establishment at the earliest date possible of the experiment station for research work in connection with the growing of truck crops in the coastal section of the State.

We were surprised to find that the hospital facilities for the student body are so inadequate, there being only six rooms to take care of a student body of over twelve hundred. While the health conditions at the college at this time are unusually good, yet we strongly recommend that an adequate hospital building providing forty or fifty beds be erected at once. We believe it false economy not to have adequate facilities to take care of the health of the student body at all times.

On Wednesday we had dinner in the Mess Hall with the student body and had an opportunity to inspect in detail the work of this department. We can not commend too highly the work of Mr. J. C. Littlejohn, Business Manager, and Captain J. D. Harcombe, in charge of the Mess Hall, and here adopt the report of the Board of Visitors of last year: "We were greatly impressed with the building, equipment, purchasing, handling, preparation and serving of the food for the student body. Everything seemed to be handled with the utmost efficiency and greatest economy. The quantity, quality, and variety of the food served the students is ample and it appeared to us that everything was handled in such a sanitary way as to promote the health of the students. We were struck with the efficiency of all arrangements for handling and serving the food and also the small cost per capita. We heard no complaint from any student of the fare, nor did we see anything that would justify any criticism whatever."

We were impressed with the interest and enthusiasm in the work of his department manifested by each of the professors or officers with whom we came in contact. There was a feeling of pride in the quality of work being done, and an earnest desire to promote welfare of the students coming under their charge. Realizing the splendid work being done, it has occurred to us that it would be a great pity if the clamor for economy should result in the reduction of salaries to such an extent that the institution and the State would lose the services of these men. We feel that such actions would be false economy.

In conclusion, we wish to express our great pleasure in finding the work of the college proceeding with such smoothness and efficiency. The relations between the student body and the professors seem to be all that could be desired. There seems to be a general air of contentment on the part of the students and a desire to cooperate with the authorities. We believe that Dr. Sikes has the hearty support of the faculty as well as the respect and affection of the student body. We believe that the institution under his able management is increasing in efficiency from year to year and is extending its usefulness more and more to the people of the State.

Mr. Cleveland Sanders was elected as hold-over for 1932 by us.

Respectfully submitted,

R. Beverley Herbert, Chairman
Jas. E. Peurifoy, Secretary.

REPORT OF SECRETARY OF FERTILIZER BOARD

Dr. E. W. Sikes, President
Clemson Agricultural College
Clemson College, South Carolina

Dear Sir:

I herewith respectfully submit the following report of the work of the Fertilizer Department for the year ending June 30, 1931.

The amount of Fertilizers sold in South Carolina for the year 1930-31 was smaller than it has been since 1921-22. The total sales for the year were 593,875 tons, from which we received a tax of $148,468.80 as compared with sales for the year 1929-30 of 751,496 tons, from which we received a tax of $187,873.92.

During the Fertilizer season we had eight Inspectors in the field but each Inspector was kept out for a shorter time, with the result that the cost of the inspection was reduced to $6,051.23 as compared with a cost of $6,947.33 for the previous year.

These Inspectors collected and our Chemical Department analyzed 1057 official samples. The results of the analyses of these official samples were published in Bulletin 276 of the South Carolina Agricultural Experiment Station, and I respectfully refer to the report of Dr. R. N. Brackett, Chief Chemist, occuring in this bulletin.

Of the official samples analyzed for the year 1929-30, 6.58 per cent were found deficient in commercial value based on guarantee, while this season 7.66 per cent were found deficient in commercial value based upon guarantee, a very small increase.

For the last few years considerable progress on the part of users and manufacturers of commercial fertilizers toward high analysis goods have predominated, and there has been a reappearance of the 8-2-2, 9-2-2 and 10-2-2 guarantees so common a few years ago.

At a meeting of he Board of Fertilizer Control in June, 1931, it was decided that beginning with the season 1931-32, every person, or corporation, before selling or offering for sale in South Carolina, any Nitrate of Soda, shall brand on each bag, or package, or tag attached thereto, the per cent of Nitrogen (ammonia equivalent) guaranteed together with the source of the Nitrate of Soda; i.e., as to whether it is "old style" Chilean Nitrate of Soda, "Champion brand" Nitrate of Soda, or "Arcadian" Nitrate of Soda.

Respectfully submitted,
D. H. HENRY,
Secretary Board of Fertilizer Control.

REPORT OF STATE VETERINARIAN

Dr. E. W. Sikes, President
Clemson Agricultural College
Clemson College, South Carolina

Dear Sir:

As requested, I respectfully submit the following report for the Clemson College Livestock Sanitary Department and the Bureau of Animal Industry, U. S. Department of Agriculture cooperating, for the fiscal year ending June 30, 1931.

As the laws of the state require the College to assist the owners in the control and eradication of all contagious, infectious and communicable diseases of livestock and prevent the importaton of animals infested with such diseases, this Department is maintained to render all assistance possible to protect our livestock industry.

An outline of our principal activities follows:

TICK ERADICATION

This class of work was conducted in the Coastal Plain counties and consisted in the inspection and disinfection of cattle, horses and mules. We are glad to report that no cattle fever ticks were found and the entire area of the state is now considered tick free.

TUBERCULOSIS ERADICATION

The plans under which this class of work is conducted are referred to as the Area and Accredited Herd Plans.

Area Plan

During the past year the work was completed in seven (7) counties. At present we have a total of twenty-three (23) counties on the Modified Accredited list, viz., Abbeville, Anderson, Cherokee, Chester, Chesterfield, Dillon, Edgefield, Fairfield, Greenville, Greenwood, Kershaw, Lancaster, Laurens, McCormick, Marion, Marlboro, Newberry, Oconee, Pickens, Saluda, Spartanburg, Union and York. Work is being conducted in Darlington, Horry and Lee counties.

Accredited Herd Plan

This plan is of greatest value to the breeders and dairymen as it not only assists them in establishing and maintaining herds free of infection but also increases the value of the animals.

A total of 13,046 herds and 47,117 cattle were tested during the year and 37 head were found infected.

The following summary gives the present status of the work:

Accredited Herds	128
Accredited Cattle	5,071
One free test herds	84,445
One free test cattle	250,860
Total herds under supervision	84,578
Total cattle under supervision	256,955

HOG CHOLERA CONTROL

It is very gratifying to report that the number of hog cholera outbreaks during the past year was considearbly less than the year previous. This was due in a large measure to the preventive treatment employed by the owners especially in those sections where the greatest amount of infection is usually found.

There was a total of 6,265 herds and 76,840 hogs treated against cholera under our supervision during the year and infection was found on only 106 premises.

OTHER DISEASES

There were two serious outbreaks of Anthrax during the year, one in Newberry County, the other in Charleston County, involving a loss of approximately sixty-five head of cattle. This is the first Anthrax infection found in our state and so far the origin has not been determined.

Requests were received from practically every county to investigate conditions in all classes of livestock that appeared to be of an infectious or contagious nature. In all instances, if necessary, suggestions were given for the proper treatment or control measures.

A summary of investigations follows:

Number of diseases in cattle	90
Number of diseases in swine	317
Number of diseases in horses and mules	4
Number of diseses in sheep and goats	6
Number of diseases in dogs	1
Number of diseases in chickens	10

A summary of activities in all classes of work is shown as follows:

Farms or premises visited	7,508
Number of persons interviewed	16,981
Miles traveled by bus or train	3,085
Miles traveled by other means	210,014

Numerous letters were received relative to conditions that did not require investigations; in these cases methods of treatment were outlined by means of letters, bulletins, etc.

LABORATORY

The demands for service of this branch of our Department continue to increase annually During the year a total of 76,767 specimens were received for examination and diagnosis from all classes of livestock, as follows:

Cattle	6,511
Chickens	70,110
Swine	27
Sheep	39
Dogs	51
Horses and Mules	10
Turkeys	11
Quail	1
Pigeons	3
Miscellaneous	4
	76,767

BIOLOGICS DISTRIBUTION

A large supply of biologics used in the prevention of livestock and poultry diseases are kept in stock so that prompt service may be rendered in outbreaks of contagious or infectious diseases.

The following summary gives the amount of products distributed:

	Mils
Anti-hog cholera serum	2,762,600
Hog cholera virus	204,000
Miscellaneous Biologics (doses)	17,933

DEPUTY STATE VETERINARIANS

The practicing veterinarians that are commissioned as Deputy State Veterinarians rendered valuable assistance in their respective communities in the treatment and control of outbreaks of contagious and infectious diseaess. The employment of this plan affords a wonderful protection to our livestock industry.

EXPENDITURES IN ALL LIVESTOCK SANITARY PROJECTS

	U. S. Bureau of Animal Industry	State of South Carolina
July 1, 1930, to June 30, 1931, inclusive	$19,092.06	$65,383.50

Respectfully submitted,

W. K. LEWIS,
Inspector in Charge & State Veterinarian.

CLEMSON AGRICULTURAL COLLEGE

REPORT OF CHIEF CHEMIST

Dr. E. W. Sikes, president
Clemson Agricultural College
Celmson College, South Carolina

Dear Sir:

I respectfully submit the following report of the analytical work of this Department on commercial fertilizers, waters, etc., done for the Board of Fertilizer Control, and for the citizens of the State, and for other Departments of the College, during the year ending June 30, 1931.

For the sake of comparison, the figures for last year are given side by side with those for this year:-

	1929-1930	1930-1931
Official samples of fertilizers	1356	1057
Farmers' samples of fertiligers	30	29
Waters	54	45
Ores, minerals, rocks, etc., for identification	22	18
Ashes (wood)	4	5
Limestones, marls, and lime	8	2
Miscellaneous	126	71
	1600	1227

OFFICIAL FERTILIZER SAMPLES

Classification

	1929-1930	1930-1931
Complete Fertilizers	1096	847
Special Mixtures (Phosphoric Acid and Ammonia)	9	10
Superphosphates	53	40
Superphosphates with Potash	2	1
Cottonseed Meals	30	23
Nitrate of Soda	47	21
Potash Salts	50	44
Dried Blood	1	1
Fish	5	2
Tankage	1	1
Sulphate of Ammonia	29	45
Miscellaneous	33	22
	1356	1057

The twenty-two miscellaneous samples consist of: one each, cyanamide, "fertilizer sweepings", castor meal; two calcium nitrate; five mixtures furnishing only ammonia and potash; and twelve home mixtures.

In the discussion which follows, all miscellaneous samples except the five furnishing ammonia and potash only, have been omitted, and also four samples: one each, dried blood and slaughter house tankage without guarantee; two samples designated as "genuine, natural Peruvian guano"; and four complete fertilizers rejected by Secretary of the Board of Fertilizer Control—in all twenty-five samples, leaving 1032 to be considered.

Deficient Samples

Of the 1032 samples considered in this discussion 79 fell below the commercial value based on guarantee, as follows:-

In available phosphoric acid	5
In ammonia	29
In potash	24
In available phosphoric acid and ammonia	5
In available phosphoric acid and potash	3
In ammonia and potash	12
In available phosphoric acid, ammonia, and potash	1
	79

Last season out of 1322 samples 87, or 6.58 percent, were deficient in commercial value based on guarantee, while this season the number so deficient is 79 out of 1032 samples, or 7.66 percent, a very small increase.

The extent to which these 79 samples fell below the guaranteed analysis in percent is as follows:-

	0.00-0.10	0.10-0.25	0.25-0.50	0.50-1	1 and over
In available phosphoric acid	1	2	3	6	1
In ammonia	20	16	3	5	2
In potash	6	3	13	5	11
	27	21	19	16	14

There are relatively fewer deficiencies than last year in phosphoric acid, but in ammonia and potash a larger number.

Of the 79 samples, which fell below guaranteed commercial value, 23 were deficient three percent or more in commercial value as follows:-

In available phosphoric acid	0
In ammonia	7
In potash	13
In available phosphoric acid and ammonia	0
In available phosphoric acid and potash	0
In ammonia and potash	2
In available phosphoric acid, ammonia and potash	1
	23

Last season out of 87 deficient in commercial value based on guarantee 22, or 25.29 percent, were three percent or more deficient, while this year 23 samples out of 79, or 29.11 percent were three percent or more

deficient. When the comparison is made on the total number of samples, last season out of 1322 samples 22 were deficient three or more percent, or 1.66 percent of the total, this season 23 samples out of 1032 were three percent or more deficient in commercial value, about 2.23 percent of the whole number, which is a slight increase.

The extent to which these 23 samples, deficient three percent or more in commercial value, fell below the commercial value guaranteed is as follows:-

	0.00-0.10	0.10-0 25	0.25-0.50	0.50-1	1 and over
In available phosphoric acid ------	0	0	0	1	0
In ammonia ----------	2	2	0	3	2
In potash ----------	0	0	2	5	10
	2	2	2	9	12

The large number of potash deficiencies is noteworthy.

For the fertilizer season of 1928-1929, for the first time, the Board of Fertilizer Control assigned a different valuation to nitrogen (ammonia equivalent) from mineral and organic sources, to the former $2.50 and the latter $5.00 per unit (that is for each percent or one pound per hundred, or for each 20 pounds per ton). This season the mineral ammonia valuation per unit was $2.00 and organic $4.00. In consequence there were, in addition to the 79 samples reported above, three samples found deficient in relative commercial value per ton, though the results of chemical analyses showed that they were up to or over their guarantees in plant food constituents. Of these three samples, two were not as much as three percent deficient in relative commercial value, while one sample was deficient in relative commercial value 8.70 percent.

As a further consequence of the difference in valuations per unit for nitrogen from mineral and organic sources, there were six samples, out of 79 above reported, deficient in relative commercial value, but not as much as three per cent, which were thus deficient because the mineral nitrogen found was so much in excess of the guarantee. Of these six samples, four were slightly deficient in ammonia and high in mineral nitrogen, while the other two were slightly deficient in ammonia and potash and high in mineral nitrogen.

As a final consequence of the difference in valuation of nitrogen from mineral and organic sources, four of the 23 samples listed above, as three percent or more deficient in relative commercial value, owed their classification to the fact that the mineral nitrogen found on analysis was much in excess of the guarantee. Of these four samples, one was slightly deficient in potash, while the other three were slightly deficient in ammonia, and all were high in mineral nitrogen.

It is to be noted that the deficiencies in relative commercial value above reported, as due to high mineral nitrogen found as compared with guarantees, were not always due to the fact that the high mineral found exceeded the very liberal limits allowed in the supplemental act to our fertilizer law.

It is noteworthy that from the standpoint of plant food constituents, nitrogen, phosphoric acid and potash, there are a larger number of samples deficient in potash than last year.

In addition to the 79 samples deficient in commercial value based on guarantee, there were 271 samples found deficient, below guaranteed analysis in one or more ingredients, the deficiency, however, being made up by an excess of other ingredients, as follows:-

In available phosphoric acid	10
In ammonia	120
In potash	119
In available phosphoric acid and ammonia	1
In available phosphoric acid and potash	2
In ammonia and potash	19
	271

Last season out of 1322 samples 336 were deficient in one or more ingredients, but not deficient in commercial value based on guarantee, or 25.42 percent, while this season out of 1032 samples 271 were so deficient, or 26.26 percent, which is a noteworthy increase.

The extent to which these 271 samples fell below the guaranteed analysis in percent is as follows:-

	0.00-0.10	0.10-0.25	0.25-0.50	0.50-1	1 and over
In available phosphoric acid	2	4	4	1	2
In ammonia	112	25	4	2	0
In potash	59	43	24	11	2
	173	72	32	14	4

These figures show about the same relative number of deficiencies in ammonia and potash, but a much smaller number in phosphoric acid than last year.

Superphosphates:- There were received for analysis this season 40 superphosphates. Of these 40, 34 were guaranteed 16 percent available phosphoric acid, all found up to guarantee; three were guaranteed 18 percent, of which two were found up to guarantee and one not three percent deficient; one each guaranteed 17, 19 and 19 1/2 percent respectively, and all found up to guarantee.

There were received for analysis last season 53 superphosphates. Of these 53, 42 were guaranteed 16 percent available phosphoric acid, of these forty were up to guarantee, while one was three percent and one not three percent deficient in relative commercial value; nine were guaranteed 18 percent and found up to guarantee; one guaranteed 17 percent and found up to guarantee; one 18.84 and found up to guarantee.

Superphosphates with Potash:- This season there was only one sample of goods of this kind, guaranteed 10-0-4 and found up to guarantee.

Last season there were only two samples of superphosphate with potash, guaranteed 10-0-4 and 12-0-6, both found up to guarantee.

Potash Deficiency in Potash Salts and Mixed Goods:- In connection with the deficiencies in potash, not only in acid phosphates with potash, but also in other mixed goods, the following summary of potash deficiencies for the past 27 years may be interesting. It is to be noted that none of the deficiencies here listed are samples deficient in commercial value:-

Year	Number of Samples	Deficient in one or more ingredients	Deficient in Potash only	Deficient in Potash, Percent
1905	522	165	53	32.12
1906	655	201	62	30.84
1907	743	153	34	22.22
1908	713	161	54	33.54
1909	805	197	85	43.14
1910	1188	235	86	36.60
1911	1605	393	182	46.31
1912	1689	380	225	59.12
1913	1922	389	90	23.13
1914	2537	534	113	21.16
1915	1227	333	107	32.13
1916	1598	378	54	14.28
1917	1594	477	75	15.72
1918	1474	438	68	15.52
1919	1301	362	100	27.62
1920	1668	519	193	37.19
1921	763	229	116	50.65
1922	722	230	111	48.26
1923	1181	360	151	41.94
1924	1272	366	173	47.27
1925	1239	368	170	46.20
1926	1327	362	125	34.53
1927	1348	441	219	49.65
1928	1525	584	229	39.21
1929	1307	367	146	39.78
1930	1356	336	125	37.20
1931	1057	271	119	43.91

This summary shows that of the samples deficient in one or more ingredients, but not deficient in commercial value, a very large percentage is deficient in potash only,

This deficiency was especially marked during the years 1909 to 1912 inclusive. While there was a considerable drop in 1913 and 1914, the percentage deficiency in 1915 was the same as in 1905. The results for 1916 to 1919 inclusive, are not very significant on account of the scarcity of potash salts during the Great War. During this period many mixtures were made without potash, so-called "special mixture". The number of such mixtures amounted in 1916 to 555, in 1917 to 640, in 1918 to 470, and in 1919 to 357, in 1920 to 284. Since 1920 there have been less than 100 each year; indeed, this season only 10,. The period 1920 to 1925, inclusive, marks a period of high potash deficiency in percentage. But it will be noticed that there is a large increase this year over last season.

AVERAGE OF ANALYSES

	1929-1930		1930-1931	
	Found	Guaranteed	Found	Guaranteed
Superphosphates				
Available phosphoric acid	17.85	16.41	18.04	16.19
Special Mixtures (Superphosphates with ammonia)				
Available phosphoric acid	8.92	8.22	7.54	6.60
Ammonia	4.67	4.54	4.40	4.45
Complete Fertilizers				
Available phosphoric acid	9.43	8.77	9.35	8.43
Ammonia	3.89	3.79	3.88	3.79
Potash soluble in water	4.15	3.91	4.16	3.96
Cottonseed Meals				
Ammonia equivalent of nitrogen	7.15	7.03	7.21	7.00
Nitrate of Soda				
Ammonia equivalent of nitrogen	19.04	18.55	18.91	18.63
Sulphate of Ammonia				
Ammonia equivalent of nitrogen	25.24	25.04	25.25	25.01
Kainits				
Potash soluble in water	13.97	12.37	15.99	15.42
Muriate of Potash				
Potash soluble in water	50.39	48.95	50.57	49.33
Sulphate of Potash				
Potash soluble in water	49.08	48.00	49.12	49.00
Manure Salts				
Potash soluble in water	21.10	21.33	21.45	21.50
Superphosphates with Potash				
Available phosphoric acid	12.57	11.00	11.09	10.00
Potash soluble in water	5.19	5.00	4.19	4.00

The above averages for sulphate of ammonia represent fourteen samples 1929-1930, and 45 samples for the present season, 1930-1931.

As was the case for the last nine years, no samples of potash salts were received this season designated as American potash, although the high guarantee of some muriates would indicate that they were American.

The averages of potash salts given above represent the following number of samples:- Kainits this year 14, last year 12; muriate of potash this year 9, last year 22; sulphate of potash this year 1, last year 3; manure salts this year 19, last year 15. There was this year one sample of sulphate of potash—magnesia, none last year.

The deficiency of potash in potash salts is worthy of special consideration, and no doubt in part, at least, explains the large number of potash deficiencies in mixed fertilizers this season:-

Of the 14 samples designated as Kainit, one each was guaranteed 12 and 12.40, and found up to guarantee; one sample guaranteed 13 1/2 percent, found 7.55 percent deficient in relative commercial value; of seven samples guaranteed 14 percent, three were found deficient 4.42, 6.71 and 13.28 percent respectively; four samples were designated High grade Kainit, guaranteed 20 percent and all found up to guarantee.

Of the nine samples of Muriate of Potash, six were guaranteed 50 percent, and 5 found up to guarantee, the remaining sample was 3.40 percent deficient; three samples were guaranteed 48 percent, of which two were up to guarantee and one not as much as three percent deficient in commercial value.

Of the 19 samples designated as manure salt, and guaranteed 20 percent, five were found up to guarantee, 8 were not as much as three percent deficient and 4 were deficient respectively 6 1/2, 8 1/4, 4.68 and 4.80 percent in commercial value; two samples were guaranteed 30, and deficient but not three percent in commercial value.

There was one sample of sulphate of potash, guaranteed 49 percent and found up to guarantee; also one sample designated as sulphate of potash and magnesia guaranteed 26 percent and found 5.46 percent deficient in commercial value.

The following table shows the yearly averages of the analyses of commercial fertilizers from the time the Board of Trustees of The Clemson Agricultural College of South Carolina took charge of the fertilizer inspection down to the present time, or from 1891 to 1931, inclusive:-

YEARLY AVERAGES OF ANALYSES FROM 1891 TO 1931, INCLUSIVE

SEASON	Superphosphates		Superphosphate with Potash			Complete Fertilizer				Cotton Seed Meals				Kainits		Muriate Potash		Nitrate of Soda		Superphosphate with Ammonia		
	Number of Samples	Available Phosphoric Acid—Percent	Number of Samples	Available Phosphoric Acid—Percent	Potash Soluble in Water—Percent	Number of Samples	Available Phosphoric Acid—Percent	Ammonia—Percent	Potash Soluble in Water—Percent	Number of Samples	Available Phosphoric Acid—Percent	Ammonia—Percent	Potash Soluble in Water—Percent	Number of Samples	Potash Soluble in Water—Percent	Number of Samples	Potash Soluble in Water—Percent	Number of Samples	Ammonia—Percent	Number of Samples	Available Phosphoric Acid—Percent	Ammonia—Percent
1890-1	49	13.02	19	11.84	1.65	173	9.34	2.68	1.96	30	—.—	8.37	—.—	21	12.75	1	51.96	1	19.22			
1891-2	29	12.92	16	11.50	1.49	112	8.83	2.80	1.95	25	—.—	8.21	—.—	18	12.51	—.—	—.—	1	18.63			
1892-3	48	12.32	26	11.63	1.22	150	9.00	2.91	1.65	20	2.62	8.40	1.32	20	12.05	—.—	—.—	—.—	—.—			
1893-4	46	13.24	22	12.01	1.51	132	9.27	2.53	1.79	22	2.45	8.64	1.69	17	12.37	—.—	—.—	—.—	—.—			
1894-5	46	13.55	15	12.09	1.66	87	9.42	2.55	1.77	33	2.58	8.19	1.66	19	12.30	—.—	—.—	—.—	—.—			
1895-6	42	13.43	26	11.99	1.39	115	9.31	2.64	1.86	34	2.57	8.45	1.61	16	12.45	—.—	—.—	—.—	—.—			
1896-7	59	13.61	34	12.06	1.61	117	9.55	2.70	1.91	40	2.53	8.69	1.64	22	12.44	—.—	—.—	—.—	—.—			
1897-8	63	13.67	50	11.54	2.06	141	9.15	2.70	1.93	39	2.37	8.39	1.58	20	12.68	—.—	—.—	1	19.23			
1898-9	73	13.74	68	11.77	1.99	134	9.32	2.73	2.21	40	2.76	8.25	1.75	14	12.78	2	51.93	2	18.96			
1899-1900	73	13.58	63	11.58	2.00	124	9.50	2.73	2.13	52	2.27	8.73	1.63	8	12.73	4	50.95	3	19.01			
1900-1	56	14.00	55	11.49	2.65	139	9.40	2.87	2.47	60	2.38	8.55	1.54	12	12.61	2	48.92	3	18.96			
1901-2	45	14.11	51	11.09	2.55	141	9.39	2.84	2.34	49	2.57	7.93	1.63	16	12.85	4	50.54	3	19.03			
1902-3	51	13.74	55	10.94	2.65	139	9.02	2.69	2.42	60	2.27	8.08	1.48	15	12.92	2	50.25	2	19.15			
1903-4	59	14.32	75	11.12	2.81	180	9.12	2.99	2.90	57	2.28	7.92	1.54	11	12.94	7	49.79	6	18.87			
1904-5	81	14.81	82	10.70	3.07	250	9.19	3.12	2.90	62	2.41	7.42	1.54	26	12.54	6	50.49	7	18.73			
1905-6	87	14.95	94	10.97	3.30	375	9.34	3.26	2.98	71	2.42	7.51	1.57	29	12.83	13	50.05	19	18.67			
1906-7	111	14.95	72	10.76	3.21	390	8.91	3.29	3.29	99	2.68	7.32	1.69	30	12.78	13	51.52	20	18.49			
1907-8	91	14.71	64	10.57	3.54	363	9.17	3.01	3.01	114	2.37	7.40	1.61	39	12.91	15	51.04	17	18.33			
1908-9	108	15.02	80	10.55	2.93	396	9.16	3.03	3.08	115	2.39	7.27	1.71	45	13.03	14	50.46	21	18.26			
1909-10	159	15.18	74	10.16	3.54	599	8.89	3.31	3.34	133	2.37	7.20	1.67	73	13.10	26	50.96	40	18.10			
1910-11	187	15.39	101	10.62	3.48	942	9.00	3.34	3.33	177	2.46	7.26	1.59	63	13.00	24	50.18	50	18.46			
1911-12	180	15.42	116	10.68	3.25	960	9.07	3.46	3.22	158	2.17	7.54	1.58	69	14.04	47	50.42	76	18.55			
1912-13	176	15.83	85	10.43	3.63	1199	8.86	3.54	3.57	171	2.56	7.37	1.65	69	13.72	29	51.51	48	18.64			
1913-14	229	16.10	91	10.63	3.93	1523	8.79	3.44	3.75	188	2.36	7.28	1.63	146	14.12	65	50.41	92	18.25			
1914-15	150	16.30	69	10.75	2.69	773	8.91	2.96	2.70	90	2.46	7.21	1.56	5	13.51	2	50.17	71	18.56	18	12.09	3.75
1915-16	200	16.40	7	10.72	2.12	385	8.73	3.42	1.49	245	2.31	7.05	1.51	3	13.44	0	—.—	33	18.53	555	8.85	3.71
1916-17	118	16.62	1	10.90	3.91	501	8.70	3.31	2.13	202	2.44	6.88	1.54	—.—	—.—	—.—	—.—	45	18.69	640	8.76	3.67
1917-18	106	16.71	3	9.99	2.82	521	8.54	3.09	2.25	266	2.33	7.06	1.57	—.—	—.—	—.—	—.—	21	18.50	470	8.66	3.59
1918-19	69	16.86	6	10.36	3.58	544	8.82	2.95	2.23	199	2.34	7.06	1.47	—.—	—.—	—.—	—.—	11	18.59	357	8.84	3.39
1919-20	81	16.47	14	9.82	3.10	992	8.64	3.27	2.92	94	2.61	7.08	1.51	65	13.82	4	46.78	40	18.47	284	8.52	3.27
1920-21	79	16.53	6	10.18	3.06	411	8.55	3.28	2.77	77	—.—	7.33	—.—	37	13.63	3	49.89	44	18.61	94	8.50	3.68
1921-22	73	17.08	2	11.40	2.71	434	8.68	3.30	2.96	30	—.—	7.39	—.—	32	12.99	3	51.43	34	18.79	89	8.63	4.01
1922-23	97	17.17	8	10.64	3.70	796	8.72	3.55	3.39	39	—.—	7.16	—.—	41	13.10	4	50.66	59	18.61	90	9.06	3.74
1923-24	83	17.41	4	10.72	3.75	906	9.06	3.61	3.52	48	—.—	7.29	—.—	59	13.64	3	48.85	58	18.70	65	6.43	5.64
1925-26	89	17.27	9	10.58	4.09	843	9.20	3.50	3.41	59	—.—	7.31	—.—	42	13.45	8	50.57	66	19.18	63	7.40	4.85
1925-26	103	17.49	5	11.39	5.56	950	9.46	3.58	3.55	51	—.—	7.50	—.—	53	13.89	13	50.64	55	18.75	39	6.46	5.30
1926-27	72	17.18	3	11.01	3.63	1030	9.32	3.46	3.47	61	—.—	7.41	—.—	42	13.50	9	50.59	41	18.83	29	7.62	5.35
1927-28	36	17.55	2	10.85	4.10	1283	9.02	3.73	3.76	50	—.—	7.25	—.—	10	13.90	7	49.26	63	18.68	24	7.17	5.23
1928-29	45	17.71	1	12.39	4.22	1087	9.29	3.98	4.03	11	—.—	7.04	—.—	8	13.24	11	50.17	57	18.91	15	6.72	4.90
1929-30	53	17.85	2	12.57	5.19	1096	9.43	3.89	4.15	30	—.—	7.15	—.—	12	13.97	22	50.39	47	19.04	9	8.92	4.67
1930-31	40	18.04	1	11.09	4.19	843	9.35	3.88	3.96	23	—.—	7.21	—.—	14	15.99	9	50.57	21	18.91	10	7.54	4.40

NITROGEN

Deficiencies, Sources

Nitrogen Deficiencies:- In connection with the subject of deficiencies of nitrogen (ammonia equivalent) for the past 27 years, the following table is interesting. It is to be noted that none of the deficient samples listed is deficient in commercial value:-

Year	Number of Samples	Deficient in one or more ingredients	Deficient in Nitrogen only	Deficient in Nitrogen, Percent
1905	522	165	61	36.96
1906	655	201	87	43.28
1907	743	153	81	52.94
1908	713	161	77	47.82
1909	805	197	74	37.56
1910	1188	235	79	33.61
1911	1605	393	107	27.22
1912	1689	380	71	18.68
1913	1922	389	190	48.84
1914	2537	534	257	48.13
1915	1227	333	145	43.54
1916	1598	378	130	34.39
1917	1594	477	224	46.96
1918	1474	438	189	43.15
1919	1301	362	160	44.19
1920	1668	519	123	23.70
1921	763	229	22	9.61
1922	722	230	41	17.82
1923	1181	360	99	27.50
1924	1272	366	105	28.69
1925	1239	368	68	18.47
1926	1327	362	137	37.84
1927	1348	441	100	22.68
1928	1525	584	120	20.54
1929	1307	367	124	33.78
1930	1356	336	130	38.60
1931	1057	271	120	44.28

This table shows that of the samples deficient in one or more ingredients, but not deficient in commercial value, a very large percentage is deficient in ammonia only, with very few exceptions. The average deficiency in ammonia for the whole period of twenty-seven years is a little more than 34.47 percent; for two seasons it amounted to nearly 50 percent; one season (1907) it amounted to more than 50 percent. The deficiency this season is considerably higher than last season. Only once in twenty-five years has the deficiency been less than 10 percent (1921).

Nitrogen, Sources:- The 1924 supplemental Act to the fertilizer law, approved March 21, 1924, effective on and after August 1, 1924, requires the manufacturer to guarantee the percentage of nitrogen, or ammonia equivalent, from mineral and from organic sources, a certain variability being allowed, and also an interchange of ammoniates of equal agricultural value within each class.

The following table, showing the guarantees of mineral and organic ammonia this year as compared with the last three seasons, may be of interest:-

Mineral	Organic	No. samples 1927-1928	No. samples 1928-1929	No. samples 1929-1930	No. samples 1930-1931
50	50	471	352	275	193
60	40	274	372	500	376
65	35	256	201	208	156
40	60	122	56	12	14
70	30	97	33	16	14
30	70	2	0	0	0
95	5	1	0	3	9
34	66	0	1	0	0
75	25	18	12	21	43
100	0	22	20	22	17
67	33	5	4	4	0
85	15	0	0	1	1
33 1/3	66 2/3	0	2	0	0
66 2/3	33 1/3	1	13	8	12
55	45	10	3	2	2
0	100	0	2	0	0
25	75	1	0	0	0
45	55	2	0	0	0
80	20	6	23	19	3
35	65	11	0	1	0
26	74	1	0	0	0
90	10	7	6	9	10
87 1/2	12 1/2	0	2	0	0
82	18	0	0	2	0
20	80	0	0	1	3
82 1/2	17 1/2	0	0	1	0
		1307	1102	1105	853

In 1926-1927 over 79 percent of the samples fell in the first three groups (50-50, 60-40, and 65-35). A study of this table shows that in 1927-1928 over 76 percent fell in the first three groups; in 1928-1929 nearly 84 percent; in 1929-1930 nearly 88.87 percent; and this season about 85 percent. The table also shows that the number of samples guaranteed 60-40 far exceed the other two groups during the last three seasons. In general more nitrogen from mineral sources and less from organic is being used in mixed fertilizers.

The variation from guarantee in organic and mineral was very large in very few cases, usually leaning to the mineral, which is partly accounted for by the fact that certain organic ammoniates yield a portion of their total ammonia content as mineral by all of our present routine methods of analysis. This is true of cyanamid, urea, acid fish, base goods, and

probably of some highly water-soluble artificial tankages, and also of Peruvian Guano. Therefore, should a manufacturer guarantee 100 percent organic ammonia and use only acid fish or only Peruvian guano the mixture would show about one to two percent mineral ammonia by our methods of analysis. On the whole, however, there was excellent agreement between the found and the guaranteed mineral and organic ammonia within the variation from guarantee allowed by the Supplemental Act of 1924, much better even than last season.

In this connection it seems proper to refer to the method for determining mineral nitrogen which has been in use in this laboratory for the past five years. This method is the Arnd Alloy Method developed at the Oppau Laboratory in Germany for nitrates, and adapted in this laboratory for use with mixed fertilizers. As the Association of Official Agricultural Chemists, though working through its Nitrogen Referee on several methods proposed, the most promising of which is a method developed by B. F. Robertson in this laboratory, has not yet adopted any method as official, we felt justified in using the Arnd Method again this year. When the Board of Fertilizer Control adopted a different valuation for nitrogen from mineral and organic sources, we sent, through the Secretary of the Board of Fertilizer Control, the following description of the Arnd Method, as we use it, to the manufacturers of fertilizers and urged them to apply it to their mixed goods as sold:-

Method for Mineral Nitrogen (Ammonia Equivalent) in Mixed Fertilizers.

"One gram of mixed fertilizer is washed on a filter with distilled water until the washings amount to 200 cc. The filtrate is then distilled in a 500 cc. Kjeldahl flask, after the addition of 2 or 3 grams of Arnd Alloy and 50 cc. of a 20 percent solution of magnesium chloride. The distillate is caught in standard acid, and titrated in the usual way. The Nitrogen (or Ammonia Equivalent) thus found represents Mineral Nitrogen (or Ammonia Equivalent).

"The distillation should be conducted as rapidly as possible, using glycerine or paraffin to prevent frothing, and leaving 25 to 50 cc. in the flask when completed."

As was the case last season, the results this season have been noteworthy for good agreement between the mineral found and found guaranteed, which would indicate that the manufacturers are making mineral and organic guarantees on the basis of determinations, by the Arnd Method, in their mixed goods as suggested by this laboratory. Furthermore, when other laboratories have checked our results the agreement has been most satisfactory. The Arnd Method has the advantage of speed, accuracy and agreement of duplicate analyses, but is open to the disadvantage of yielding some mineral from such organic sources as urea, cyanamid and acid fish, and Peruvian Guanc. However, the liberal limits allowed by our fertilizer law for variation of mineral and organic nitrogen (or ammonia equivalent) from guarantee, will

take care of this discrepancy, unless very excessive amounts of the materials mentioned are used. We have this season used the Robertson Method in all cases in which the mineral nitrogen found varied from the guarantee beyond the limit allowed by our fertilizer law, and also when the deficiency in relative commercial value was due solely to this cause.

GUARANTEES OF COMPLETE FERTILIZERS

For several years there has been a movement in progress on the part of the users and manufacturers of commercial fertilizers toward high analysis goods, and a fewer number of brands or guarantees. In several states, with the cooperation of the state experiment stations, such a step

July 11, 1925, the following note appeared in the "Clemson College Weekly News Notes:"

FOR BETTER FERTILIZER FRACTIONS

Use Approved Analyses of High Grade Mixtures

"Representatives of the fertilizer manufacturers recently met with the proper officials of the agricultural colleges of North and South Carolina and Georgia with a view of agreeing upon a limited number of analyses which would meet the needs of the soils and crops of these three states.

"Anyone who observes the number of fertilizer formulas on the market," says T. S. Buie, Associate Agronomist* at the college here, in discussing the matter, "cannot but be impressed with the large number of analyses offered for sale. Very often two brands will differ by only one-half of one percent of one element of plant food. If manufacturers were able to concentrate on fewer analyses of higher grade their overhead cost of production would be lessened, which should result in an ultimate saving to the farmer.

"The list of approved analyses agreed upon is given below:

6-7-5
7-5-5
8-3-5
8-4-4
8-4-6
8-5-3
10-2-4
10-4-2
10-4-4
10-5-3
12-4-4
12-0-4
12-4-0
12-3-3

"The college authorities will recommend to the farmers of their respective states only formulas which were included in this list, and the manufacturers will encourage their sale by local dealers, paying particu-

*(Now Dr. T. S. Buie, late Head of Agronomy Division).

lar attention to those of higher analysis of plant food. This list includes none which carries less than 16 units of plant food. Instead of an 8-3-3 (long a stand-by of the farmer), there is a 12-4-4 which contains plant food in approximately the same proportions, but being in a more concentrated form usually costs less per unit.

"While some of these approved analyses may not be best adapted to South Carolina use, at least one may be found which will meet the need for any common field crop grown on the average soils of the state. Farmers of South Carolina are urged to consider carefully these approved analyses, especially those of higher grade, when planning the purchase of fertilizer."

A perusal of our annual fertilizer bulletins for the last four or five years, and a comparison of the guarantees, would disclose a gradual disappearance of the 8-2-2, 9-2-2, and 10-2-2 guarantees so common in previous years, and their replacement by 8-3-3, 8-4-4, 10-4-4, 12-4-4 and in the last four years even by 15-5-5, 16-4-4, 18-6-6, and even higher grades.

The following table shows the number of samples received of the suggested analysis during the last four years:

	1927-1928	1928-1929	1929-1930	1930-1931
6-7-5	0	0	2	0
7-5-5	171	140	113	70
8-3-5	29	23	25	10
8-4-4	204	148	164	123
8-4-6	6	3	8	5
8-5-3	0	1	2	1
10-2-4	4	2	5	0
10-4-2	79	62	43	19
10-4-4	116	148	162	86
10-5-3	4	5	3	0
12-4-4	53	58	59	26
12-0-4	0	1	0	0
12-4-0	1	0	0	0
12-3-3	16	13	4	3

While there was no sample 6-7-5, we had samples guaranteed: 7-6-7, 7-5-7, 7-5-8, 6-4-10, approximating 6-7-5. Only one sample 8-5-3 was received this season, but we had samples guaranteed: 8-4-3, 8-3-6. The one sample of superphosphates with potash received this season was guaranteed 10-0-4 instead of 12-0-4. Instead of 12-4-0, we have received and analyzed one each, 10-4-0, 6-4-0, and 10-3-0; and four samples 8-3-0.

In view of all these facts, is has been thought that it would be interesting to compare the guarantees of complete fertilizers for the past four years on samples received for analysis in this laboratory:-

	1927-1928	1928-1929	1929-1930	1930-1931
8-3-3	382	280	300	314
8-4-4	204	148	164	123
10-4-4	116	148	162	86
7-5-5	171	140	113	70
12-4-4	53	58	59	26
10-4-2	79	62	43	19
10-3-3	47	22	33	19
7-5-7	8	19	30	24
8-3-5	29	23	25	10
8-2 1/2-1	18	14	15	7
10-2-2	14	7	13	4
15-5-5	24	15	9	2
8-4-10	--	--	9	4
8-4-6	6	3	8	5
7-8-5	8	27	6	4
10-2-4	4	2	5	0
12-3-3	16	13	5	3
10-4-6	--	--	5	4
12-4-2	11	7	4	1
8-4-2	2	4	4	2
12-2-2	--	--	4	4
12-3-5	--	--	4	2
8-2-2	12	7	3	7
9-2-2	16	7	3	5
10-5-3	4	5	3	0
8-6-3	--	--	3	0
10-3-5	--	--	3	2
[illegible]		--	3	0
9-3-7	--	--	3	0
11-2-4	--	--	3	4
7-7-10	--	--	3	0
7-6-7	--	--	--	14
7-7-7	--	--	--	3
6-4-10	--	--	--	6
8-5-8	--	--	--	4
8-5-5	--	--	--	3
10-3 1/2-5	--	--	--	5
9-3 1/2-5	--	--	--	4
Miscellaneous	59	76	49	57
	1283	1087	1096	847

It may be of interest to note some of the miscellaneous guarantees this season:-

12-2-3; 12-2-4; 12-3-4; 12-4-6; 12-6-6; 11-7-10; 10-3-2; 10-3.5-4; 10-7-10; 10-4-3; 9.45-4.25-3; 9-2.5-12; 9-3-3; 9-3-7; 9-4-7; 9-2-3; 9-3-5; 9-5-4; 8-5-3; 8-10-2; 8-4-3; 8-3-6; 8-5-7; 7-10-5; 7-6-10; 7-5-6; 7-4-1; 7-5-8; 6-4-3; 4-9-4; 4-7 1/2-2 1/2; 3-7-3; 2-18-4; 16 1/2-20-21; 27-10.94-9.

Farmers' Samples of Fertilizers:- In addition to the official samples of fertilizers collected by inspectors, there have been analyzed this season 29 samples for purchasers, of which 15 were collected and analyzed, as provided for in Section 17 of the fertilizer law, effective July 1, 1920, and 14 were home mixtures. There were received for analysis last year 30 samples.

Waters:- Of the 45 samples of water listed, 12 were analyses of the College water supply; 25 were sanitary analyses; 2 complete mineral analyses; 2 for canning purposes; 1 for watering plants; water supply 1; for determination of oil, 1; and boiler purposes 1 (for Mr. J. C. Littlejohn, Business Manager).

Ores, Minerals, etc.:- 18 clays, micas, quartzes, iron pyrites, etc., were received and examined this season as compared with 22 last season.

Limestones, Marls, and Lime:- Two samples of material of this nature were analyzed this season as compared with eight last season.

Miscellaneous:- Consisted of one each: Borings from tunnel; oyster shell screenings; "Napier" grass; velvet bean meal; pigeon manure; chicken manure; lubricating oil for Mr. J. C. Littlejohn, Business Manager; nicotine dust; soil for arsenic; potash salts; "sweepings" for fertilizer analysis, 3; "bag shakings" for fertilizer analysis, 3; 11 samples of soils were analyzed, which included 4 for lime requirements and 7 for determination of phosphoric acid, ammonia, potash and lime. 8 samples of fertilizers were analyzed for W. B. Rogers, of the S. C. Experiment Station, and 3 samples for C. S. Patrick, Supt. of Farms. Land plaster, 2; home brew, 2; fertilizer for check work, 3; sand, 2; **insecticides for Crop Pest Commission:** Calcium arsenate, 11; molasses and calcium arsenate, 1; molasses for calcium arsenate determination, 2; arsenate of lead and Bordeaux mixture, 1; finally, there were received for analysis 7 specimens of the human body in cases of suspected poisoning, and one sample of corn meal and one of alcoholic liquor in connection with toxicological cases.

Distribution of Work:- The fertilizer analyses were made by Messrs. B. F. Robertson, J. T. Foy, and B. Freeman. The samples were prepared for analysis by Mr. Robertson and Mr. Foy, with the assistance of a helper in the grinding.

All of the nitrogen work, including total mineral and organic determinations, was done by Mr. Robertson.

The water analyses were made by Mr. Freeman, as well as the analyses of miscellaneous materials, except toxicological cases by Mr. Robertson, and calcium arsenate and like materials by Mr. Foy.

It gives me pleasure to be able to say that all of the work has been faithfully and efficiently performed, and that a spirit of loyalty and cooperation has prevailed.

Respectfully submitted,
R. N. BRACKETT,
Chief Chemist.

REPORT OF STATE CROP PEST COMMISSION

Dr. E. W. Sikes, President
Clemson Agricultural College
Clemson College, South Carolina.
Dear Doctor Sikes:

Attached herewith is the Annual Report of the South Carolina State Crop Pest Commission for the year ending December 31, 1931.

Very truly yours,

GEO. M. ARMSTRONG, *State Pathologist*
FRANKLIN SHERMAN, *State Entomologist*

Nursery Inspections

As is the usual custom the nursery inspections were begun during the latter part of June and completed during late August. It has been determined by plant quarantine officials that when only one inspection of nurseries can be made during a season, that this be done as late in the summer as possible. We have found it impossible to make more than one inspection of nurseries during the season, consequently, have delayed beginning these inspections until as late in June as possible. The number of nurseries and the acreage has increased slightly over last year. The principal increase in acreage is due to the expansion of the bulb industry located in several coastal counties.

In general the nurseries were in better condition than last year. No appreciable winter injury occurred, and the early spring weather was very favorable for the maximum growth of the plants. Insect pests and plant diseases were not common, none of major importance being encountered. As is the case every year, however, there were a few scattered infestations of aphids, red spiders, scale insects and leaf feeding insects. No material damage was done in any case. The nurserymen are well posted on the control of the common pests, and they readily call upon the Commission for advice with problems with which they are not familiar. The infestations and injury are, consequently, kept at a minimum. The most common plant diseases encountered were various diseases of the foliage none of which does severe injury. Root knot and crown gall are still found in some nurseries but are not as common as in previous years.

Ninety-six nurseries were inspected during the year covering about 950 acres. A great many of these nurseries as will be noticed from the enclosed list are small, due primarily to the fact that the average nurseryman in South Carolina is not financially able to tide himself over the years in which it takes the plants to grow to marketable size. These nurseries occur throughout the state one or more in each of all but eleven counties.

Besides the regular nursery inspections, there have been as in previous years, numbers of inspections made for home owners who can not be classed as regular nurserymen, but who sell through the mails any surplus plants that they might have. There has been a noticeable increase in requests of this kind during the past year.

There were issued to nurserymen of this state during the season 4,955 permit tags for the inter and intra-state shipments of nursery stock. Following is a list of the South Carolina nurseries, no list is kept of the home owners who receive inspections because these vary from year to year.

Name of Nursery	Kind of Stock	Acreage	Address
Aiken Grow's of Oranm'ls	Ornamentals	1/2	Aiken
Aeolian Hill Nursery	Ornamentals	1 1/2	St. Matthews
Anderson, Mrs. O. D.	Ornamentals	5	Anderson
Antreville Pecan Nursery	Pecan	2	Antreville
Baldwin, George	Ornamentals	1	Columbia
Bluebird Nursery	Ornamentals	5	Easley
Borden Nursery	Ornamentals	1	Borden
Boxwood Nursery	Ornamentals	1/2	Darlington
Briggs Nursery	Ornamentals	1	Greenwood
Buckfield Plantation	Narcissus	600	Yemassee
Bush, James C.	General	1/4	North Augusta
Blue Ridge Nursery and Bulb Farm	Ornamentals	1	Aiken
Calhoun Gardens	Ornamentals	1/4	Clemson College
Campobello Nursery	General	1	Campobello
Carolina Pecan Nursery	Pecan	4	Fairfax
Carolina Floral Nursery	Ornamentals	6	Charleston
C. F. & H. Nursery	General	3	Andrews
Curtis, J. A. & C. C.	Grapes	1/4	McBee
Cherokee Gardens	Ornamentals	1/10	Columbia
Cornwell Gardens	Ornamentals	1/8	Chester
Champbell, W. A.	Narcissus	2	Sheldon
Clark, W. W., Mrs.	General	1/10	Lynchburg
Dailey's Nursery	Ornamentals	8	Clinton
Dantzler, M. O.	Pecan	2	Orangeburg
Darnell, R. L.	Strawberry	1/10	Williamston
Davis, John O. Nursery	General	1 1/2	Ware Shoals
Dibble Nursery	Oranmentals	3	Orangeburg
DeLoache, Mrs. Heidt	General	1/10	Estill
Dorr, L. A.	Ornamentals	2	Belvedere
Dunn's Nursery	Ornamentals	1/4	Camden
Dunean Nursery	Ornamentals	1	Greenville
Edwards, Mrs. T. C.	Bulbs	-	Johnston
Eidson, Mrs. A. L.	Bulbs	-	Johnston
Ellis, O. B.	General	1/4	Level Land
Elm-Abode Nurseries	Ornamentals	8	Columbia
Estillena Pecan Nursery	Pecan	4	Lena
Evergreen Nurseries	Privet	1	Conway
Edwards Nursery	Ornamentals	2	Darlington

Name of Nursery	Kind of Stock	Acreage	Address
Fant Greenhouses	Ornamentals	1	Anderson
Fishburne, A. G.	Ornamentals	3/4	Sumter
Flowerland Nursery	Ornamentals	1	Charleston
Follin, H. G.	Perennials	1/2	Sumter
Greenville Nursery Co.	General	35	Greenville
Geraty, W. C. Co.	Narcissus	25	Yonges Island
Gillespie Nurseries	General	7	Taylors
Gillison, Mrs. Paul	Annuals	1/10	Seneca
Grove Nursery	Ornamentals	1	Marion
Guion, L. I.	Pecan	4	Lugoff
Green Gate Gardens	Iris	1	Bennettsville
Green Bros. Nursery	Ornamentals	1	Elloree
Hamlin, T. R.	Privet	1/2	Mt. Pleasant
Harrison, Joseph M.	Narcissus	25	Charleston
Jones, Miss Annie	Bulbs	3/4	Westminster
Keitt, Mrs. Thos. W.	Citrus trifoliata	1/4	Newberry
Lybering, E. L.	Ornamentals	2	Sumter
Lockwood, A. L.	Gladiolus	1	Anderson
Lewis Bros. Nursery	Ornamentals	1 1/2	Myrtle Beach
McGee Nursery	General	1/4	Anderson
Miller Brothers Nursery	Ornamentals	7	Roebuck
Moss, Chas. A.	Ornamentals	1/4	Spartanburg
McLeod, Miss Annie	General	1/10	Camden, Rt. 1
Newton, E. C.	Privet	1/4	Tatum
Oaklawn Nurseries	Ornamentals	2	Mayesville
Owen Brothers	Ornamentals	1/4	Aiken
Pacolet Mills Nursery	Ornamentals	4	Pacolet Mills
Palmetto Floral Nursery	Ornamentals	2	Charleston
Palmetto Nurseries	Ornamentals	-	Florence
Piedmont Nurseries	General	1	Gaffney
Pinson, W. A.	General	1/10	Honea Path
Pinehurst Nursery	Ornamentals	3	Summerville
Rock Hill Nursery	General	4	Rock Hill
Rosewood Greenhouses	Ornamentals	1/4	Columbia
Simons Nursery Co., Inc.	Ornamentals	3	Johns Island
Skinners Nursery	Ornamentals	1	Charleston
St. Andrews Nursery	Ornamentals	3	Charleston, Rt. 1
Summerville Floral Nursery	Ornamentals	3	Summerville
Salter, T. P.	Pecan	3/4	Trenton
Shannon Farm Nursery	Ornamentals	1/2	Jefferson
Stuckey Pecan Orchard	Pecan	4	Dalzell
Senn, Mrs. L. E.	Perennials	1/10	Chesnee
Santee River Nursery	General	2	Gourdin
Statesburg Forest	Forest	4	Sumter
State Forest Nursery	Forest	2	Camden

Name of Nursery	Kind of Stock	Acreage	Address
Talleys Nursery	General	2	Florence
Twixtboro Nursery	Ornamentals	2	Darlington
Taylor Bros. Nursery	General	35	Greer
The Three Trees Flower Farm and Nursery	Ornamentals	1	James Island
Tuck, Mrs Oscar	Achemine	-	Westminster
Utopia Nursery	Ornamentals	6	Greenwood
Wannamaker, J. E., Jr.	Pecan	5	St. Matthews
Watsons Pecanwood Nur.	Pecan	15	Orangeburg

Greenhouse Inspections

As required by the regulations of the Commission the greenhouses were inspected one or more times during the year. The number of greenhouses has remained the same though the number of square feet under glass has shown an increase from 475,000 square feet to approximately 480,000 square feet. The increase represents additions to old houses.

The common greenhouse pests such as aphids, mealy bugs, midges, red spiders and scale insects were in evidence as usual. In only one greenhouse did we find an insect requiring special control measures. This particular insect was the Argentine ant, while not new to South Carolina, still in recent years has become a subject of quarantine by some states. This ant is a rather serious household pest and may be spread in the soil around the roots of plants. The seriousness of this pest was emphasized and eradicative measures prescribed. It is hoped that the infestation will be cleaned up by this fall. It is known to occur in South Carolina at Charleston, Summerville, Gaffney, Clifton and Spartanburg.

Various plant diseases such as rusts, leaf spots and wilts were found, but none causing serious damage. Following is a list of the green houses inspected this season. With few exceptions the greenhouses of this state do only an intra-state business.

Name	Address
Blackman Greenhouse	Darlington
Bush's Greenhouses	North Augusta
Carolina Floral Co.	Charleston
Carolina Garden	North Augusta
Camden Floral Co.	Camden
Darlington Greenhouses	Darlington
Eison, Inc.	Columbia
East End Greenhouses	Orangeburg
Eau Claire Greenhouses	Columbia
Fant's Greenhouses	Anderson
Floral Hill Gardens	Mt. Pleasant

Name	Address
Gilliam, Henry, 49 W. Pinckney St.	Abbeville
Gilliams, Florist	Greenville
Graceland Cemetery and Floral Co.	Greenville
Glen-Ayers Floral Co.	Spartanburg
Hite Floral Co.	Aiken
[illegible]ing, O. L.	Greenwood
Hollywood Greenhouses	McColl
Laurens Floral Co.	Laurens
Marion Floral Gardens	Marion
Moss, Chas. A., Florist	Spartanburg
Magnolia Floral Co.	Charleston
Palmer & Lee	Sumter
Palmetto Floral Co.	Charleston
Palmetto Greenhouses	Florence
Reid Flower Shop	Rock Hill
Raysor Floral Co.	Greenville
Simpson Floral Co.	Barksdale
Shandon Greenhouses	Columbia
Summerville Floral Co.	Summerville
St. Andrews Nursery	Charleston,R.1
Talley's Flower Shop	Florence
Wales Garden Greenhouses	Columbia
Wessel's Florists	Aiken
Weinold Floral Co., 811 Augusta Street	Greenville

Bulb Inspections

Federal quarantine 62 requires that all bulbs of the narcissus type be inspected twice before inter or intra-state shipments are permitted. The first inspection is made while the plants are growing in the field and another while in storage. The regulations cover two flies known respectively as the greater and the lesser bulb flies and an ell worm. All are rather serious pests of these plants and are not widely distributed throughout the United States. The bulb industry has increased rapidly during the past several years, due to the fact that foreign bulbs, except where new varieties are to be tested, are prohibited entry. These pests are common in the bulb growing districts of Europe.

During the storage inspection this season we had the pleasure of having with us an expert inspector of the Plant Quarantine and Control Administration at Washington to aid and advise us. So far we have not found either of these pests in the South Carolina plantings though they occur in neighboring states and may be expected to occur in our own plantings some time in the future.

Approximately 850 acres of narcissus were inspected totaling about 65,000,000 bulbs. Below is a list of the commercial growers of this state.

Name	Adddress
Buckfield Plantation	Yemassee
W. C. Geraty Co.	Yonges Island
Joseph M. Harrison	Charleston,R.1
Aeolian Hill Nursery	St. Matthews
Russell S. Wolf	Orangeburg
W. C. Campbell	Sheldon
W. D. Tallevast	Florence

Besides these commercial growers there are many inspections made for growers of smaller quantities who sell principally through the "Market Bulletin."

Parcel Inspections

During the course of a shipping season there is received at this office considerable numbers of packages of plant material shipped by parties who wish to send them to friends or relatives in this or other states. All of these packages are inspected and if found free of dangerous insect pests and plant diseases are forwarded to destination.

For the sale of cuttings of various shrubs and flowering plants this office issued 23,000 labels. One of these labels is attached to each package and takes the place of the large shipping tag required on express shipments.

These labels are also issued to greenhouses outside of the state that make only parcel post shipments into South Carolina.

Registration of Out-of-State Nurseries

As in previous years it has been required of all out-of-state nurserymen to file with this office signed copies of their nursery inspection certificate, after which there is issued to them at cost, if desired, permit tags one to accompany each shipment of nursery stock coming to South Carolina. These certificates signify that these nurseries have been officially inspected and the stock found apparently free of dangerous plant pests. During the year 275 nurseryemn registered and to these were issued 35,299 permit tags. This is an increase of twenty-two nurserymen and 7,227 tags over last year. These nurseries are located in twenty-nine states extending from the Pacific to the Atlantic and from the Gulf of Mexico to the Great Lakes, making it imperative that the Commission be ever on the alert to prevent the untimely introduction of dangerous plant pests.

Sweet Potato Inspections

The number of sweet potato growers have increased from ninety in 1930 to 178 in 1931. The regulations require three inspections of the properties of all growers of plants or seed for sale, so it may be seen that during these there were made 534 sweet potato inspections. These growers are located in 32 of the 46 counties of the state, thus necessitating considerable travel. The center of the plant growing industry in probably Hampton county. Colleton and Orangeburg are the principal seed producing counties though many of the other counties produce considerable quantities of both.

Due to the extended drouth over most of the state this summer sweet potatoes have not made the usual growth. During the field inspection wilt was found in a few fields in the Piedmont section. Most of the infections have been found in fields where the proper rotations have not been carried out. Some has been found in fields of new growers who were not familiar with the disease and from year to year have not used any precautionary measures.

During the storage inspection the soft rots and some black rot were encountered. During this inspection directions for bedding and treating is impressed upon the growers, consequently, during the plant bed inspection very little disease is encountered.

We have required as heretofore all out-of-state growers to meet the same restrictions as our growers, and to file with the Commission certificates of inspection properly executed by official inspectors of their states before we have authorized shipments of plants into South Carolina. This is done in order that no diseases may be shipped into the state. Following is a list of sweet potato growers by counties:

Name	Address
Abbeville	
Ellis, O. B.	Level Land
Anderson	
Darnel, Mrs. R. L.	Williamston
Rogers, A. L.	Williamston
Aiken	
Dicks, F. P.	Windsor
Dunbar, F. F.	Beech Island
Salley, G. R.	Wagner
Woodward, A. W.	Aiken
Wright, George	Aiken
Woodward, Mrs. H. U.	Aiken
Allendale	
All, Mrs. F. R.	Ulmers
All, J. B.	Ulmers
Aughley, J. D.	Fairfax
Brant, John M.	Ulmers
Deer, L. R.	Ulmers
Harter, W. J.	Ulmers
McMillian, J. B.	Ulmers
Walker, Mrs. Dora Dee	Appleton
Zeigler, P. J.	Allendale
Barnwell	
Harley, J. E.	Barnwell
Bamberg	
Wyman, J. A.	Bamberg
Berkley	
Montague, R. L.	Mt. Holly
Colleton	
Antley, J. C.	Canadys
Guess, E. L.	Round
Guess, W. H.	Round
Risher, C. M.	Round
Smoak, Guy L.	Round
Warren, T. J.	Ruffin
Utsey, A. C.	Round

Name	Address
Calhoun	
Pearlstine, Shep Co.	St. Matthews
Zeagler, W. C.	Lone Star
Chesterfield	
Davis, Clyde	Chesterfield
Clarendon	
Butler, I. S.	Manning
Meliette, A. T.	Manning
McFadden, J. McD.	Manning
Strange, S. A.	Manning
Snyder, W. T.	Manning
Rast, F. M.	Manning
Darlington	
Galloway, Chas. W.	Hartsville
James, R. E.	Lamar
Dorchester	
Burbage, L. M.	Summerville
Jamison, D. F.	Summerville
Mellard, J. W.	Jedburg
Nettles, J. W.	Summerville
Simmons, R. B.	Summerville
Sheider, J. M.	St. George
Harbeson, L. M.	St. George
Rumph, J. M.	St. George
Dukes, A. C.	St. George
Browning, W. B.	Ridgeville
Tucker, A. S.	Ridgeville
Shuler, W. P.	St. George
Wimberly, M. L.	St. George
Hutto, R. W.	Harleyville
Florence	
Anderson, W. A.	Florence
Johnson, A. B.	Lake City
Palmetto Nurseries	Florence
Stokes, C. E.	Florence
Greenwood	
Davis, N. H.	Greenwood
Jones, J. S.	Greenwood
O'Dell, Lee	Hodges
Greenville	
Batson, J. W.	Greenville
Loftis, C. B.	Taylors
Moore, T. H.	Greenville
Means, J. E.	Greenville
Roper, W. U.	Greenville
Piedmont Plant Co.	Greenville
Georgetown	
Ambrose, L. R.	Plantersville
Platt, J. D.	Georgetown

Name	Address

Hampton

Ayers, Thos. J.	Furman
Causey, J. F.	Furman
Causey, John G.	Furman
Collier, D. L.	Scotia
Crapse, G. H.	Lena
Crapse, H. T.	Lena
Davis, T. A., Jr.	Scotia
Davis, W. F.	Garnett
Davis, W. H.	Furman
Davis, W. Jesse	Scotia
Deason, H. H.	Furman
DeLoache, Mrs. M. J.	Furman
DeLoache, W. O'Neil	Pineland
Dickson, Mrs. L. G.	Scotia
Goethe, J. L.	Furman
Gohagen, D. B.	Scotia
Gohagen, G. W.	Furman
Gohagen, Mrs. R. J.	Scotia
Gohagen, J. L.	Furman
Husbands, W. C.	Garnett
Causey, W. J.	Furman
Prince, Mrs. A. I.	Scotia
Tuten, F. B.	Estill
Tuten, M. P.	Estill
Kittles, T. J.	Garnett
Mason, Mrs. R. V.	Scotia
Mixon, H. A.	Furman
Peoples, Mrs. M. L.	Scotia
Robert, J. H.	Scotia
Tuten, G. C.	Estill
Tuten, Mrs. Hattie	Furman
Stokes, S. S.	Scotia
Tyler, Mrs. R. M.	Scotia
Crapse, L. C.	Estill
Tuten, George	Furman
Herndon, J. C.	Furman
Mixson, R. F.	Estill
Goethe, J. S.	Scotia
Pender, D. L.	Scotia
Henderson, L. P.	Scotia

Jasper

Carter, M. B.	Tillman
Jaudon Bros.	Tillman
Miller, W. T.	Pineland
Garbode, John	Tillman
Ellis, W. R.	Tillman
Garbode, H. W.	Tillman

Kershaw

Smith, L. E.	Bethune

Name	Address
Lancaster	
Faile,J. M.	Taxahaw
Faile, W. N.	Jefferson
Faile, J. O.	Jefferson
Pardue, W. E.	Lancaster
Williams, Bruce	Heath Springs
Laurens	
Hill, J. B.	Ware Shoals
Gibbs, W. H.	Laurens
Medlock, F. E.	Laurens
Patterson, J. Talmage	Lanford
Lexington	
Cleckley, A. C., Jr.	Swansea
Long, J. Hampton Mrs.	Gilbert
Rawl, Walter	Gilbert
Corley, Melt	Lexington
Sox, W. L.	Lexington
Kaminer, Joe	Lexington
Porth, Raymond	Lexington
Porth, Archie H.	Lexington
Harmon, Matthew	Lexington
Corley, A. F.	Lexington
Lucas, S. W.	New Brookland
Lee	
McCutcheon, Henry	Bishopville
O'Kelly, Dr. D. B.	Bishopville
McCormick	
Parker, W. R. (Col.)	Troy
Talbert, Dennis	Troy
Oconee	
Brown, Mrs. Arthur	Walhalla
Jones, W. S.	Seneca
Lawrence, T. R.	Seneca
Lowie, R. B.	Seneca
King, D. W.	Westminster
McJunkin, W. H.	Westminster
Marett Farm & Seed Co.	Westminster
Morgan, Rob	Walhalla
Mulky, J. C.	West Union
Powell, L. J.	West Union
Wright, R. O.	Townville
Orangeburg	
Culler, Edgar L.	Orangeburg
Dantzler, M. M.	Parler
Dantzler, T. M.	Parler
Dukes, J. G.	Neeses
Fulmer, J. B.	Cope
Gramling, T. L.	Orangeburg
Hutto Brothers	Vance
Price, J. N.	North
Smith, J. A.	Holly Hill
Smith, L. W.	Holly Hill
Way, M. C.	Holly Hill
Zeigler, R. L.	Orangeburg
Jackson, J. M.	Orangeburg

Pickens

Gibson, Truie, Mrs. ---------- Norris
Raines, A. P. ---------- Easley
Suddeth, J. C. ---------- Easley
Sutherland, W. H. ---------- Pickens

Richland

Holt, D. T. ---------- Wateree
Kelly, W. C. ---------- Hopkins

Saluda

DuBose, William ---------- Monetta

Spartanburg

Pearson, J. A. ---------- Wellford
Settle, J. H. ---------- Inman

Williamsburg

Guess, J. N. ---------- Lanes
Stancil, D. H. ---------- Hemingway
Stucky, R. W. ---------- Hemingway
Prosser, H. L. ---------- Kingstree

Inspection of Apiaries

The apiaries of all persons selling queen bees or package bees have been carefully inspected to determine whether or not the destructive brood diseases were present. These diseases are known as American and European foul brood. The former is the most serious bee disease with which we have to contend. Fortunately, neither of these diseases is very wide spread in this state and it has been our policy to eradice wherever found. European foul brood may be satisfactorily controlled by requeening with good Italian queens and uniting two or more weak colonies. American foul brood, however, is more difficult to control. The only recourse being burning everything except the hive bodies which are then treated with a special solution. During the past season about about 1,200 colonies were inspected for these diseases. American foul brood was found in two yards and immediate steps were taken for eradication. About 1,000 certificates were issued during the season for the shipment of queen bees. Very few packages bees were shipped due to the cold wet spring.

An effort is made to protect the South Carolina apiaries from diseases of other states by requiring out-of-state shippers to file with this office acceptable evidence that diseases do not occur in their apiaries. Without such evidence this Commission will not issue permits for shipments into South Carolina.

Cotton Seed Regulations

The cotton seed regulations have remained the same. Each shipper of cotton seed for planting purposes is reuqired to file with the Commission affidavits statng that the seed are practically free of wilt and anthracnose. Out-of-state growers are required to comply with the same restrictions. Permit tags are required attached to each shipment and for this purpose there was issued 70,921 tags.

Phony Peach Disease

As stated in our report of last year there has been found in the states of Georgia, Alabama, Louisiana, Arkansas, Mississippi and South Carolina a comparatively new disease of peach known as Phony Peach. Since that time the disease has been found in Florida, Tennessee, Illinois, Texas and North Carolina.

During the summer of 1930 a preliminary scouting survey was made in South Carolina for this disease. Twenty-two orchards containing 85 phony trees were found. These orchards occurring in Aiken, Calhoun, Greenville, Greenwood, Hampton, McCormick, Newberry, Orangeburg, Saluda, and York counties. Fifty-nine of these 85 trees were in commercial orchards the remainder were in home orchards. By commercial orchards is meant any orchrad containing one hundred or more trees.

During the first week in May there was conducted at the Peach Disease Laboratory at Fort Valley, Georgia a school known as Phony School which was attended by one or more inspectors from all of the infested states. At this school the inspectors were traiend how to diagnose the disease in the field, and given thorough instruction regarding all known facts about the disease. These inspectors later cooperated with inspectors of the Bureau of Plant Industry and Plant Quarantine and Control Administration in a systematic survey of all of the commercial orchards of the various states. Mr. M. B. Stevenson of this Commission was auhorized to attend this school and to cooperate in every way possible with the Bureau. On May 25, 1931 Mr. Stevenson in cooperation with three inspectors of the Bureau of Plant Industry began these inspections and continued throughout the month of June and until July 24.

Commercial orchards in 36 counties were inspected, having a total of 649,975 trees. Forty-three phony trees were found as follows: Aiken 2; Calhoun 1; Charleston 1; Chesterfield 8; Colleton 6; Greenville 6; Richland 2; Saluda 14; Spartanburg 1; Sumter 2. Seventeen of these trees were found in orchards that contained phony trees last year. In these same orchards fifty-seven phony trees were found last year. No systematic survey was made in home orchards, but two trees were found in such orchards within a mile radius of nurseries.

In addition to the services of Mr. Stevenson the Commission furnished a car for the two months covering 7,420 miles.

Before beginning these inspections it was first necessary that contacts be made with every orchardist and cards signed giving the inspector permission to look over the trees, mark all infected ones and to remove these from the orchard when directed to do so. In making these inspections it was necessary that every tree come under the scrutiny of the inspectors. The growers cooperated most heartily with the inspectors, no trouble whatever being encountered.

In view of what is now known it is our opinion that the Commission should cooperate in every possible way with the Bureau of Plant Industry and the Plant Quarantine and Control Administration in the eradication of this disease.

Japanese Beetle

It was stated in our report of last year that the Japanese beetle, a serious pest of nursery and ornamental stock and other plants, was probably moving southward more rapidly than other insect pests of major importance.

During the summer of 1931, as is done every summer, the Plant Quarantine and Control Administration carried on considerable scouting and trapping for this insect in areas not known to be infested. During July a number of traps were placed about the city of Charleston as well as other southern and western cities. Four of the beetles were thus captured in Charleston. One each on Wentworth, Laurens, Columbus and Lee Streets, all adjacent to the Atlantic Coast Line railroad. The beetles this year were also found at Columbus and Cleveland, Ohio, making South Caorlina and Ohio the two newly infested states. The beetle had previously been found in Connecticut, Delaware, District of Columbia, New Jersey, Maryland, New York, Pennsylvania, and Norfolk Virginia.

The Japanese beetle was first discovered in this country near Riverton, New Jersey in 1916. It is believed that the insect reached the United States as larvae in the soil about the roots of plants from Japan. The beetle deposits eggs in the soil, the larvae or grubs hatching from them, and feeding on grass roots and decayed vegetable matter until autumn, when they become full grown. No feeding occurs during the winter, but in the spring the grubs feed for about a month before transforming to pupae. These change to adults or beetles about the middle of June. The beetles cause damage by feeding on foliage and fruit, more than 200 food plants being recorded. The grubs cause serious injury to sod lands through the damage which they inflict on the roots of grasses. There is one generation a year.

At present the Plant Quarantine and Control Administration in cooperation with the state is contemplating treating with arsenate of lead about twenty-three acres of soil immediately surrounding the infestation at Charleston. This treatment consists of spraying with a power sprayer arsenate of lead on the soil and then washing it in with water. This is to kill the grubs that might be in the soil. It is estimated that six tons of arsenate of lead will be required for this treatment.

At present (September 1931) no quarantine has been placed against the shipment of articles from this territory.

Miscellaneous

No new developments in the Pink Boll Worm, European Corn Borer or other major pests have occurred during the year. Their presence in other states, however, are constant reminders that we ever have to be on watch to prevent their introduction into the state in advance of natural spread.

REPORT OF EXPERIMENT STATION

Introduction

Agriculture is the most competitive business in the world. It occupies more territory, requires more capital, and affords employment to more people than any other single industry. Furthermore, it is an almost certain means of earning a livelihood. Relatively few of the six million rural families in the United States are ever compelled to go hungry and, although their standard of living is in many cases very low, it is superior to no standard at all, and somehow manages to remain above the subsistence level. This is one reason why agriculture is such a competitive business; why greater numbers have not left the country for the cities, and why so many persist in farming even under difficulties.

Under conditions such as these economical production of quality products for which there is a demand affords the only hope of profit. One of the aims of agricultural research is to determine ways and means by which this may be accomplished. The ultimate aim, of course, is to provide the knowledge upon which a better satisfied and more prosperous rural life might be built.

The publications of this experiment station have from time to time reported a degree of success in the realization of this purpose. While no special effort has been made to evaluate these accomplishments it is believed that they are worth many times more than their total cost.

Agriculture has been backward in its appreciation of the value of research. According to a recent survey only $0.43 per $1,000.00 of capital invested in agriculture goes into the investigation of ways and means of increasing the returns on the investment while in industry the expenditures for research amount to $13.00 per 1,000.00 of capital invested. The late Andrew Carnegie is reported to have said that he would give a million dollars to know how to reduce the cost of producing steel ten cents per ton. Research has accomplished this feat and many others and will be the means of reducing still further the cost of producing and marketing many of our principal products.

A few illustrations of what has been accomplished by this experiment station will serve to show that South Carolina has invested well the small sum of less than ten cents out of each $100.00 taxes collected on property which goes for agricultural research work.

(1) The rather phenominal accomplishment of the research department of this institution in developing methods for producing cotton economically under boll weevil conditions has been referred to in annual reports and in bulletins but it is just within the past few years that these methods have been generally adopted and results reflected in the census figures and crop reports. The average yield of lint cotton in South Carolina during the first three years after the weevil became

established over the entire state (1922, 1923, 1924) was 154 pounds; for the last three years (1929, 1930, 1931) 211 pounds an average gain of 57 pounds per acre. This 27% increase in efficiency in cotton production has resulted in an increased income of approximately seven million dollars from the two million acres planted this year.

(2) Experiments conducted with hogs at Clemson and at the Coast station at Summerville show that hogs grazed on soybean forage required only two-thirds as much grain to produce 100 pounds gain as did similar hogs when kept in dry lot. This means an added profit of $2.00 per hog and if these practices were followed in raising and finishing the 400,000 hogs raised in the state every year would mean an increased profit of $800,000.00.

(3) The application of the results of research sometimes means the difference between success and failure of an undertaking. Some of the best varieties of apples grown in South Carolina are completely barren except when interplanted with other varieties which produce viable pollen to pollinate their flowers. Studies made at Clemson during the past five years indicate clearly which varieties are sterile and which varieties produce viable pollen that will successfully pollinate their own flowers and the flowers of other poor pollen producers.

(4) Results of research frequently enable us to save crops from destruction by insects and plant diseases. In 1929 one of the peach growers of Greenville County estimated that he lost $8,000.00 from the ravages of the Oriental peach moth. The following year members of the experiment station staff introduced into his orchard large numbers of another insect parasite on the Oriental peach moth and the loss was only nominal.

These four illustrations of the value of research, each in a different field of science, will serve to indicate in a general way the kind of benefits that are being derived from this fact finding, fact interpreting service.

The following pages will present a brief report of progress made on the more important lines of research now under way.

Research in Agricultural Economics

Prosperous farms are necessary if a contented and stable farm life is to be maintained. The different studies of the Agricultural Economics Division are directed toward this object. It has been evident since the studies of farm management, marketing and other agricultural economics problems were begun that some of the farms in any area are profitable even in adverse periods of time.

Farming is one of the most competitive of all businesses. In meeting the competition it is essential to organize farms according to well proven facts and principles of economics. It is essential to farm in line with the outlook for supply, demand and prices. The operation of the farm

must be highly efficient. More thinking is needed. More speed in the work can be realized through the use of better adapted equipment and power. By close attention to the many details of management farmers will find the way to lower costs of production

The present time is one of the great price decline. The general price level fell approximately 23 per cent in the 12 months ended in July. In the 12 months ended in August the price of cotton declined 44 per cent, the price of wheat 37 per cent, corn 33 per cent, oats 45 per cent, hogs 20 per cent, eggs 25 per cent, butter 24 per cent, and Irish potatoes 36 per cent, to list only a few of the commodities which South Carolina farmers produce. The farmers answer to lower prices must be found in lowering costs. This is difficult for some of our farmers who are already equipped with high priced equipment. It is also difficult to realize low costs because some production goods have not yet declined in price in line with the general trend. By careful buying of farm and family supplies, it is possible to reduce expenses as a whole approxiamtely ten to 20 per cent compared with the average. This is a conservative statement.

Records of approximately 3,500 farms in South Carolina have been secured. The schedules have been constantly improved. Each record consists of approximately 2,000 answers to questions and 30 pages of detailed facts. Studies of the marketing, imports, exports and surrounding production at the cities of Anderson, Charleston, Columbia, Florence and Greenville have been completed and published. Marketing studies of cotton and hogs as commodities are under way. More general projects include studies of land prices and farm credit.

FARM ORGANIZATION AND MANAGEMENT

(W. C. Jensen, B A. Russell, and C. Gunnells)

The Upper Piedmont Area

With a view to determining the more profitable farming systems and practices in the Piedmont region, detailed farm management records are secured from a large number of farms. Many of the records are obtained by the survey method and a number of them are the result of record books kept by representative farmers. The results are tabulated, interpreted and made available for timely application on the farm.

The upper Piedmont, where this work has been centered, is a highly important agricultural part of South Carolina. Anderson, Greenville, Spartanburg and other neighboring counties are foremost in the state in production and in agricultural development and wealth. A large share of the cotton crop of the state is produced in these countries. Their importance in cotton is particularly pronounced, relative to the Coastal Plains, in recent years. A few of these counties have now surpassed the high 1920 level of cotton production.

The Piedmont studies have resulted in extensive facts and interpretations regarding production costs, farm incomes and economic trends. In arriving at different conclusions, correlation, cost analysis and many other lines of analysis have been utilized. The results are available to all farmers. Bulletins 221, 230 and 264 and Circular 46 have been published in order to present the results secured. Circular 46, taking up a special survey in 1930, was the last publication to be released. It appeared in February, 1931.

Farm maintenance—raising foods for the family, raising feeds for the livestock and workstock, and keeping up soil fertility—is one important phase of good management. This is especially true at present. It is possible for practically every farmer to raise approximately 75 to 85 per cent of the total food suply of his family. The best paying farms follow this practice. Provision for farm maintenance ordinarily requires the use of about half the crop land. The other half is available for raising cash crops. There are three economic reasons why farm maintenance is desirable—

1. It utilizes idle land, labor and equipment in many cases.
2. The production for maintenance may be credited at a retail price since it would have to be bought if it were not raised. It therefore, pays to raise such products for farm use when it might not pay to raise them to sell at wholesale prices.
3. The practice is an importance element in safe farming.

Experience is of great importance in determining the place of different crop and livestock enterprises on a farm. Intensive studies of the best paying upper Piedmont farms have been made for seven different years. The results indicate that the best farmers, on the average, plant the following acreages of stated crops per mule—cotton eight to 14, corn three to seven, oats one to two, hay two to four, wheat less than one acre. The best farmers have one milk cow to every one or two mules, one hog to every two to four mules, and 15 to 20 chickens per mule.

Although 1930 was a year of unusually low cotton prices, the best managed farms made some money in that year. Their average operator's earnings was $1,459. The poorest paying farms made only $473 operator's earnings and a minus labor income. The best paying farms had an average of 32.5 acres of cotton and worked two to four mules in most cases.

The expenses of the best paying farms in 1930 were greater than those of the poorest paying farms but less than the average of all farms. The receipts of the best paying farms averaged $2,020 as compared with $1,502 on the poorest. Sales of sweet potatoes, livestock products and cotton were larger on the best than on the poorest paying farms.

The Pee Dee Area

The purpose of this study is to determine the more profitable forms of farm organization and the factors which influence efficient production of tobacco, cotton and other commodities produced in the area. The improved farm management schedules are used. The farm management facts covering incomes and costs of production are tabulated and interpreted each year and historical facts from the Census are also tabulated and interpreted.

The Pee Dee is a great farming area. We have considered it to consist of 11 counties. Many kinds of crops and livestock can be successfully produced here. Even with unusually low prices in 1930, the value of the two leading cash crops amounted to about $25,000,000. In addition to cotton and tobacco a number of enterprises are conducted on a commercial scale. It has been found that operator's earnings frequently vary from nothing up to $2,000 per farm. The cost of producing cotton in 1930 varied from five cents up to approximately 30 cents per pound. Much the same was found in the case of tobacco. Some farmers produced corn for less than 50 cents and oats for less than 30 cents per bushel. These figures show the importance of finding out what are the actual causes of low-cost, high profit farms.

Approximately 400 farm records were secured for the period, 1925 to 1928. It is planned to secure approximately 50 records in the area each year in this way keeping the study up to date. The results in detail are given in Bulletin 269 which contains 80 pages and 50 tables and was published in January, 1931.

The average operator's earnings of 369 farms studied in four years was $1,275. The highest earnings on any one farm was $10,340 and the lowest was minus $1,745. The earnings of the best 25 per cent of the farms averaged $2,931 in the four-year period, as compared with only $74 for the poorest 25 per cent of the farms.

The best farmers usually employ the more advanced methods and practices. They produce more foods for family use than do other farmers. They secure relatively large acre yields of crops. This means that the market value of their crops per acre is much greater than on the average and poorest paying farms. The best paying cotton and tobacco farms had an average of 6.8 acres of cotton, 3.7 acres of tobacco, 6.5 acres of corn, 2.1 acres of oats, 3.9 acres of hay, and 2.3 acres of other crops per mule over a period of four years. There are about 25 acres of crops per mule on these farms.

Farm maintenance consists of raising foods for the family, feeds for the livestock and workstock and maintaining the soil. From approximately 7.5 to 12.5 acres per mule was found to be required in the Pee Dee area for farm maintenance. This, on the average, leaves from 7.5 to 12.5 acres per mule for cash enterprises.

The Orangeburg Area

Orangeburg county is one of the most important agricultural counties in South Carolina. The type of farming here is rather distinct from that in other parts of the Coastal Plains. In acres of crop land Orangeburg county ranks first in the state, having 256,300 acres in 1930. The county had 7,329 farms in 1930, only Anderson and Spartanburg counties ranking ahead of it in number of farms. In total value of land and buildings, this county is only outranked by Anderson, Greenville and Spartanburg. Orangeburg is the leading hog county in South Carolina, having 31,832 head on April 1, 1930. In the last census year, 1929, Anderson county held first place in the state in cotton production. Orangeburg was second with 51,777 bales.

Eighty farm management records were secured for each of the years 1928 and 1930. Approximately 100 records are being secured for the 1931 year. Attempts are being made to secure the most recent results possible which will be typical of the present period of unusually low price conditions. A detailed bulletin of results covering the three years is in preparation.

The average operator's earnings, which includes foods produced for the family, of the farms recorded in 1928 was $897. The receipts averaged $4,137 per farm. The best paying 25 per cent of the farms averaged $2,821 operator's earnings. The poorest 25 per cent averaged less than nothing. The best farmers had an average of 180 acres in crops as compared with 140 acres for all the farms. While the average yield of cotton per acre on all the farms was only 209 pounds, it amounted to 275 pounds on the best paying farms, several of which had yields around one bale per acre.

The hog enterprise is one important source of cash receipts on a number of the farms in the Orangeburg area. On 18 of the 80 farms the net returns from livestock amounted to $300 or more per farm. The area is naturally well adapted to corn and soybeans. The average yield of corn per acre is greater than in many other parts of the state, probably ten per cent greater on the average. This and other factors make it possible to raise hogs to better advantage than is possible in the Piedmont region.

The Orangeburg area has the comparative advantage of relatively high acre yields of certain crops. This partly determines the type of farming found. Feed production is rather easy and this encourages the keeping of hogs on a commercial scale. The hogs are shipped largely to Richmond and Baltimore. Cotton production, while discouraged by present supply, demand and price conditions, is the major farm activity and the crop is well adapted. More of the methods of large scale farming are being adopted, and will probably continue to increase, as a means of lowering costs and making larger farm profits in this area.

The Newer Truck Area

The objective of the economic studies being conducted in the truck areas is the development of principles for successful growing and selling of the many vegetables produced in the lower and coastal section of South Carolina. Since the trucking industry is developing so rapidly in the state and there is so much interest in facts regarding this line of production, many requests for results have been made.

Surveys of farms and statistical studies are being carried on. The areas from Williston in Barnwell county southeastward are included in the work. The same methods as employed in the other surveys are being applied. Particular attention is being given, however, to selling practices and problems.

Vegetable crops grown on a commercial basis rank third in value among all South Carolina crops, cotton holding first place and tobacco second. The total acreage of commercial truck crops in South Carolina in 1930 was 78,620. The total value of the production of truck on this land was $7,785,000, or an average value of $99 per acre. While commercial truck crops use only one to two per cent of the state's crop land, they are very important in the farming systems of certain parts of the state as is indicated in a later chapter. The 1930 prices for cucumbers and watermelons were extremely low and those for asparagus were rather low. With normal prices, the value of the commercial truck crops in the state is placed at $10,000,000.

Early Irish potatoes and cabbage are by far the most important, but a number of other crops such as asparagus and beans bring in large returns also. The growing importance of South Carolina as a trucking state is indicated by the fact that in 1921 the commercial acreage was 32,224 while in 1929 it was 54,630 and in 1930, 78,620, according to the Census.

One hundred and twenty records of farmers for 1929 and 1930 have been tabulated and interpreted. The results, together with statistical facts, were published as Circular 45 in January, 1931. Seven of these show operator's earnings of $5,000, and the 30 best paying farms averaged well over $3,000 operator's earnings. The average operator's earnings of all farms was slightly more than $1,000. The experience of the high-profit farmers is one important indication of what pays best.

The operator's earnings of 25 per cent of the farms were more than twice that of the average of all farms. The better paying farms are a good basis for determining, in a general way, the reason why some farms pay well. The best farms in each area are characterized by higher market value of crops per acre, higher yields per acre, and better prices for produce sold. It is significant that for each $100 of receipts the best farmers expended only $67, as compared with $81 per $100 receipts on all farms, in the Bamberg area in 1929. The other areas show similar results.

In determining the best paying farming systems, labor distribution and cost data are necessary in deciding on the economic place of each crop on a farm. Cotton and asparagus fit well together from a labor distribution standpoint. The asparagus work is over in April and the heaviest cotton work then begins. Turnip greens require work from July to November principally and make an excellent supplementary crop. Irish potatoes do not fit well into the farming system except on the coast.

The farms studied have relatively large investments compared with the average of all farms in the entire state. The average amount of capital per farm is about $25,000. Of the total farm investment 50 to 60 per cent is in land and about 20 per cent in buildings, on the average. The investment in machinery and equipment is about $750, and livestock and workstock are valued at approximately $1,200 per farm.

Irish potatoes cost more per acre than any other truck crop studied, asparagus being next and cantaloupes third. Watermelons cost least per acre of any truck crop. With the exception of Irish potatoes, man labor and mule work expense together make up 20 to 40 per cent of the total cost of producing the different truck crops. Seed and barrel expense comprise nearly half the cost of producing Irish potatoes. Fertilizer is a relatively large cost for all truck crops.

The cost to the farmer of getting a container of vegetables packed and delivered can be considered a definite outlay to be met. When prices become so low that they only equal this cost, as is sometimes the case, farmers naturally will not take the crop out of the field. For example, Irish potatoes will not be dug if the price is round 60 cents a barrel. Cutting asparagus takes an average of 1.4 man hours per crate. The corresponding operation on Irish potatoes takes about 0.5 man hour and 0.5 mule hour per barrel. In the case of beans, 0.3 man hour is used per hamper and for cucumbers the operation takes about 0.7 man hour per hamper. The cost may be determined by multiplying the hours by the rate per hour.

The marketing problems are being met successfully by the cooperative associations of the area. Practically all of the produce is marketed from April to July. The high quality of the vegetables porduced is enhanced by the careful performance of grading and inspection and other marketing services.

It seems evident that truck production will continue the upward trend of the past decade. As population grows, more vegetables will be needed. The important thing is to forget about arbitrary increases and keep the porduction each year in as close balance with consumption as is possible. Statistics provide an accurate basis for this practice. The future of the truck industry of this area depends largely on comparative costs, but also on labor, yields, markets, and prices.

COMPARISON OF MECHANICAL AND HORSE POWER

(B. A. Russell)

The main object of this study was to determine the cost and utilization of the different forms of power on typical farms in the Coastal Plains and Piedmont regions of the state. Emphasis was placed upon data relative to costs, since the cost and efficiency of power determine its utilization.

Data for the present study were obtained by the survey method. During the spring of 1930 the Bureau of Agricultural Economics, the Bureau of Animal Husbandry and the Bureau of Public Roads of the United States Department of Agriculture, and the South Carolina Agricultural Experiment Station conducted a power study on representative farms in South Carolina.

Farm tractor power in South Carolina has been introduced in comparatively recent years. Prior to 1918 very few tractors were purchased by the farmers, and all of those were used priamrily for custom work. The use of tractor power in agricultural production in South Carolina is in the experimental stage; its future development cannot be forecasted with any degree of accuracy.

The South Carolina farmer has been experiencing very adverse conditions since 1920 due to the severe depression and to the very unfavorable weather conditions which resulted in low incomes for several years in succession. It would be conservative to say that unless the size of the farm business is increased to a considerable extent, the place of the tractor will continue to be greatly restricted.

One hundred farmers were interviewed for this study. Approximately 50 surveys were taken in the Coastal Plains and 50 in the Piedmont region for 1929. A study of grain harvesting by binder and thresher was made for 1929. A similar study of combine harvester costs was conducted in the summer of 1931. About 75 per cent of the combines in the state were included in the study. The results have been tabulated and interpreted and published as Bulletin 280, "Farm Power Utilization and Costs."

The cost of mule power per mule ranged from six to 38 cents on the farms in the Coastal Plains and from six to 29 cents on the Piedmont farms. The cost of this power per hour averaged 13 cents in the latter region and 12 cents in the Coastal Plains. The extent of the utilization of this power partly determines the cost. The expense per hour of tractor power averaged $1.05 in the Coastal Plains and $0.84 in the Piedmont region. The costs varied from 43 cents to $4.90 in the Coastal Plains region and from 30 cents to $4.32 in the Piedmont region according to this study.

There is a direct correlation between the cost per hour of tractor power and the number of hours which it is used per year. When a tractor was used 300 hours per year the cost amounted to $1.06 per

hour; when used 600 hours the cost was reduced to 70 cents while if it was used 900 hours the cost was only 60 cents per hour. There seems to be no economic justification for tractor power unless it can be used 500 to 750 hours during the year. A 10-20 horsepower or two-plow tractor should replace 3 to 4 mules and a considerable amount of man labor, sometimes as much as one or two families, on farms where tractors are adapted.

COTTON MARKETING STUDY OF THE STATE

(W. C. Jensen, M. Guin, and H. A. White)

To find out how farmers can market cotton most efficiently and obtain the best possible price for it is the broad aim of the sudies in cotton marketing. In 1931 the objective has been enlarged to include not only grade and staple estimates but also determination of the nature of the movement of cotton in the different marketing channels and estimates of the costs of marketing. The project at present has four divisions—

1. Grade and staple estimates
2. Price-quality studies
3. Movement of cotton
4. Costs of marketing

The methods of securing the facts upon which to work is based upon the theory of sampling. The sampling of cotton in the years 1925-1927 was conducted by the Station alone. Beginning in 1928, the South Carolina Experiment Station and the United States Department of Agriculture conducted studies intended to obtain complete estimates of the staple grade and tenderability of cotton produced in South Carolina each year. Ginners are so selected as to represent, individually, their territory and, collectively, the state as a whole.

Each year the cooperating ginners provide the branch office of the Department of Agriculture in Atlanta, Georgia, with a sample of each bale of cotton ginned in the current crop year. The samples are graded and stapled by expert cotton classers according to government standards and form a basis for the estimates under consideration. Price studies are conducted at six to eight representative markets in the state each year. The price as well as the grade and staple are recorded in these markets.

The improvement in the staple of South Carolina's cotton since 1928 is notable. In 1928 only 38.1 per cent of the state's crop was of 15/16 inch staple or longer, while in 1930 the corresponding figure was 55.6 per cent. The percentage of 7/8 inch cotton decreased from 55.0 to 41.7 and 13/16 inch and under dropped from 6.9 per cent to 2.7 per cent during the same period.

Holding the grade constant, all of the markets handling staples 1 1/16 and over of white cotton paid an average premium for it, varying from 85 cents to $5.25 per bale in seven local markets studied for the 1929-1930 season. Two markets penalized 1 and 1 1/32 inch staples $1.15 and $1.35 per bale, while the best market paid a premium of $3.85 per bale for it, compared with 7/8 inch staple as a base. All the markets paid a small premium for 15/16 inch staple of the same grade, except one market having only one buyer, which penalized it $1.75 per bale. The price paid for 13/16 inch staple white cotton varied from a premium of 15 cents to a discount of $2.65 per bale.

Of the factors affecting quality, variety is very important. Economic studies in several communities indicate that farmers can produce 15/16 inch to 1 1/16 inch cotton successfully, obtaining as good yields of lint per acre as with shorter cottons. Time of ginning, ginning methods, and a number of other factors also influence quality. Quality is a matter not only of staple but also of grade, character and uniformity.

South Carolina mills demand a uniform, high quality cotton. They use relatively more high quality cotton than the United States mills as a whole. In a recent typical year, this state consumed 1,209,679 bales of which 79 per cent was 15/16 inch or longer and 32 per cent was 15/16 inch staple.

All farmers who grow cotton can profit by studying market factors and demand so that they can produce a product which best meets the general needs and which will make them the greatest possible farm profit.

Bulletins 270 and 279, and Circular 47 report the results of these studies in detail. They may be had upon request.

TAXATION AND ABILITY TO PAY IN SOUTH CAROLINA

(G. H Aull)

It is commonly believed that the burden of taxation, because of the operation of the general property tax, rests more heavily upon farmers than upon other groups. Studies have been made in several states which indicate that this is actually the case. The question of tax equalization is and has been for a long time a favorite topic for discussion but only very recently has information been made available to show just where tax burdens are unequal and the extent of their inequality.

It is the purpose of this study to gather and analyze the facts as regards the amount of taxes paid by different groups of individuals in South Carolina and the ability for these groups to pay. Several measures of ability are being used including gross and net incomes, operators earnings, investment, and total expenditures.

The study is cooperative with the South Carolina Tax Commission, this body having furnished from its file of income tax returns the statistical information necessary in a study of this sort. In each instance however a number was substituted for the name and "country" or "city" for the address of the person filing the return. These data are supplemented by other from farm management surveys conducted in various sections of the state.

The tabulations are not complete as yet but preliminary results indicate (1) that a considerable number of South Carolinians having substantial incomes are paying relatively little in taxes, (2) that the possessors of taxable property are in a disadvantageous position with relation to tax burdens; and (3) that many, especially those who do not own property, are escaping taxation altogether.

Experiments with Field Crops and Fertilizers

Research work with field crops, soils and fertilizers point the way to improved practices and more efficient methods of producing our most important crops. This work is conducted at Clemson College, at the three sub-stations and in cooperation with farmers on various sections of the state.

SMALL GRAIN VARIETY TESTS

(H. P. Cooper and B. E. G. Prichard)

The yields secured in these tests are high because the soil where the tests were made is very productive.

The grain crops were preceded by a good growth of soy beans. Each variety was grown in rod rows one foot apart. There were 8 to 13 replications, or 9 to 14 rod rows, for the various varieties. The rod rows were systematically distributed over the field.

The yields secured in the small grain tests show that winter grain crops can be grown very successfully in this section. In many situations the winter grain crops are more economical stock feed than corn.

Oat Variety Test

The varieties of oats commonly recommended for use in South Carolina are included in the variety test. These varieties are grown under uniform conditions in order to determine the varieties best adapted to the conditions of the state.

Appler, Ninety Six and Coker's Fulghum were the leading varieties. These varieties are considered of equal value since the small differences in yield are well within the expected variation for such a test. The climatic conditions for this season seem to have been favorable for the early varieties of oats.

Barley Variety Test

Seven varieties of barley were included in this test. The Bearded Winter barley yield was very high. The beards on this variety were

very stiff and it is difficult to break off the awns close to the grain, and this partially accounts for the high yield of this variety. The C. A. C. Awnless Compact type also produced a high yield of grain.

Rye Variety Test

The Abruzzi types of rye are generally the most suitable varieties for this region. Coker's Abruzzi variety led the list with a yield of 35.4 bushels per acre. The Rosen rye was much later in maturing than the Abruzzi varieties.

Wheat Variety Test

The wheat yields were very satisfactory. Coker's Red Heart, Leaps Prolific and Boggs were the leading varieties in the test.

EFFECT OF CALCIUM ARSENATE ON THE PRODUCTIVITY OF CERTAIN SOIL TYPES

(H. P. Cooper, W. R. Paden, E. E. Hall, W. B. Albert, W. B. Rogers, and J. A. Riley)

Applications of calcium arsenate in cotton boll weevil control work apparently has affected the productivity of certain soil types.

The accumulation of arsenic in some of the soil types has caused a marked reduction in the yield of certain crops. The effect of the arsenic was first noted at the Pee Dee Experiment Station at Florence, S. C., where frequent applications of calcium arsenate were made to control the cotton boll weevil. Several farmers have reported unproductivity of soil where calcium arsenate dust was used.

Since there is little doubt about calcium arsenate depressing the yield of some crops on certain soils, it is desirable to know the soil types which are most affected by additions of arsenic.

It seemed that the quickest way to secure the desired information on the response of various soil types would be to add relatively large amounts of calcium arsenate to soil types differing widely in their physical and chemical properties. Greenhouse pot cultures and field plats are included in these studies. The following soil types have been used for these tests: Norfolk sand, Norfolk fine sandy loam, Greenville sandy loam, Greenville clay loam, Durham coarse sandy loam, Cecil sandy clay loam and Davidson clay loam.

The range in amounts of calcium arsenate added varied from 25 to 100 pounds per acre for the Norfolk sand. The applications on the Davidson clay loam ranged from 250 to 2500 pounds per acre. The amounts for the other soil types ranged between these two extremes.

It has been observed that these soil types vary markedly in their response to additions of calcium arsenate. The coarse textured gray sandy soils, such as the Norfolk and Durham series, are seriously affected by a relatively light application of calcium arsenate. Whereas the fine textured dark colored soils, such as the Greenville, Cecil and Davidson series, are not seriously affected by applications of calcium arsenate which would be commonly used in combating the cotton boll weevil.

Results from the Additions of Calcium Arsenate to Soil for Greenhouse Pot Cultures

Two-gallon plots were filled with soil of the following types: Durham coarse sandy loam, Greenville sandy loam, and Davidson clay loam. Varying amounts of calcium arsenate were added to each soil type. Sufficient amounts of calcium hydroxide were also added to the Durham coarse sandy loam and Greenville sandy loam soils to neutralize the soil acidity. The amount was 600 pounds per acre for the former soil type and 2250 pounds per acre for the latter.

Very large amounts of calcium arsenate are required to depress the growth of crops on Davidson clay loam. The lighter applications often stimulate the growth of certain crops on this soil type. The 250 pound application of calcium arsenate produced a marked depression in the growth of cotton on Greenville sandy loam. Lime in sufficient quantities to neutralize the soil acidity greatly increased the growth of cotton in the pots to which calcium arsenate was added.

The 50 pound application of calcium arsenate to the Durham coarse sandy loam depressed the growth of cotton. The pots receiving 100 and 150 pounds of calcium arsenate produced a very poor growth. Lime partially overcame the depressing effect of calcium arsenate on the growth of cotton on this soil. The growth of cowpeas on Durham coarse sandy loam, to which 50 pounds per acre of calcium arsenate were added, was very poor both with and without lime.

Response of Crops on Field Plats to Additions of Various Amounts of Calcium Arsenate

Twenty-seven 1/100 acre plats on Cecil sandy clay loam at the Clemson College Station were treated with amounts of calcium arsenate varying from 0 to 6000 pounds per acre on November 10, 1930. Each rate was applied to three separate plats. Dolomitic limestone at the rate of one ton per acre was applied to one-half of each plat. Three rows of each of the following crops were planted on each plat: vetch, oats, barley, wheat and rye. The growth of vetch and oats was depressed by 50 to 750 pounds per acre applications. The growth of barley was depressed by the higher rates of application. The growth of wheat was apparently stimulated by the lighter applications of calcium arsenate. The yields from the 500, 750 and 1000 pound applications were greater than the yields of the untreated check plats. The higher rates seemed to depress the yields of wheat.

The rye crop proved to be very resistant to calcium arsenate toxicity on this particular soil. The growth of rye apparently was increased by all the rates of applications of calcium arsenate. The increase in growth ranged from 64 per cent for the 750 pound application to 6 per cent for the 6000 pound application.

On Cecil sandy clay loam wheat and rye are much more tolerant of additions of calcium arsenate than barley and oats.

In the spring of 1931 cooperative tests with three selected farmers were started. The rates of application of calcium arsenate ranged from 0 to 2000 pounds per acre on Greenville sandy loam and Greenville clay loam, and from 0 to 2500 pounds on Davidson clay loam. Corn, sorghum, cotton, soybeans and cowpeas were planted on each plat. Complete dry weight yield data are not available for all these tests.

On Greenville clay loam, the 250 pound application of calcium arsenate depressed the growth of corn, soybeans and cowpeas. The 1500 and 2000 pound rates of applications produced a marked decrease in yields of all three crops.

On the Greenville sandy loam the 250 and 500 pound applications of calcium arsenate did not materially decrease the yield of any of the crops. The soybean, cowpea and sorghum yields were depressed by the higher rates of application of calcium arsenate.

There was very little difference in the growth of any of the crops on the plats located on Davidson clay loam. Cowpeas, which are very sensitive to arsenic toxicity on gray sandy soils, made a very good growth on the plat receiving as much as 2500 pounds of calcium arsenate per acre.

The data secured from the various experiments suggest that the amount of calcium arsenate necessary to depress crop yields is definitely related to chemical and physical properties of the various soil types.

Effect of Iron Sulfate in Overcoming Calcium Arsenate Toxicity

It has been observed in recent years that the growth of cowpeas was very poor on some of the experimental plats receiving large amounts of phosphorous. The plats where these observations were made have received frequent applications of calcium arsenate for controlling the cotton boll weevil.

Each of the plats in the Fertilizer Rotation Experiments at the Pee Dee Station was divided into four sections and cross treated as follows: No. 1 340 pounds of iron sulfate, No. 2 100 pounds of manganese sulfate, and No. 3 2000 pounds of limestone. The fourth was left without any cross treatment.

The unfertilized plat and the no phosphorous plat produced more cowpeas than the plats receiving phosphorous. The iron sulfate produced a marked increase in the growth of cowpeas on the plats which received a large amount of phosphorous in the fertilizer. It is possible that the iron in the iron sulfate combines with the arsenate radical to form an insoluble compound. It is suggested that the low yield of cowpeas on the plats receiving heavy applications of phosphorous may be due to a limited amount of reactive iron in the soil, since soluble phosphates, as well as soluble arsenates, combine with iron to form insoluble compounds.

The yield on the check section of the unfertilized, floats and basic slag treated plats yielded approximately the same. The addition of iron sulfate had very little effect on the yield of cowpeas on these plats. The yield of cowpeas on the superphosphate plats was around one-half the yield from the above named three treatments. Iron sulfate almost doubled the yield of cowpeas on the superphosphate plats. The soluble phosphates very probably combine with the reactive iron in the soil to form insoluble iron phosphate. The low yields, on the plats fertilized with relatively large quantities of soluble phosphate, probably are due to a deficiency of reactive iron to combine with soluble arsenates to form insoluble arsenic compounds. The phosphorous in floats and basic slag is only slightly soluble in water and most of the phosphorous probably remains in the form of insoluble calcium phosphate and does not deplete the reactive iron in the soil.

The red soils which are high in iron seem to be much more tolerant of additions of calcium arsenate than gray soils which are low in reactive iron.

SAND DROWN OR MAGNESIUM DEFICIENCY IN COTTON

(H. P. Cooper)

There are numerous cotton fields in the Coastal Plain section of the state deficient in available magnesium. The soil conditions at the Sandhill Experiment Station afford excellent opportunities for studying the effect of a deficiency of available magnesium on the growth of various crops. Magnesium deficiency in the soils usually results in a peculiar red color of the leaves of cotton. The red color is first noted on the lower leaves. Magnesium deficiency partially accounts for the unsatisfactory yield of crops on many fields in the state.

Sand drown or magnesium hunger may be controlled by the addition of materials containing available magnesium. Dolomitic limestone, potash salts containing magnesium and epsom salts or magnesium sulfate have been effective in controlling magnesium deficiency at the Sandhill Experiment Station. All of the above material gave perfect control of sand drown when applied to Norfolk sand and Norfolk sandy loam soils.

USE OF LIMESTONE

(H. F. Cooper)

Since much of the soil in the state is too acid for the successful production of many crops, lime has been applied to many of our experimental plats in order to get a quantitative measure of the effect of lime on the yield of various crops.

Dolomitic limestone has been applied to one-half of some of the potash experimental plats at the Sandhill Experiment Station. The growth of Austrian winter peas, hairy vetch, and soybeans has been greatly im-

proved by limestone. The limestone improved the early growth of cotton and corn. The dolomitic limestone was effective in controlling sand drown or magnesium deficiency in cotton and corn.

Use of Dolomitic Limestone in Mixed Fertilizers

A number of fertilizer companies are using dolomitic limestone in their mixed fertilizers. The use of dolomitic limestone increases the cost of fertilizer, but on many of our soils, which have not been limed, the increased yield from the limestone will more than pay for the additional cost of the fertilizer. The addition of limestone containing magnesium will prevent a magnesium deficiency and it will increase yields of crops on many of the sandy loam soil types in the state.

PLACE EFFECT OF FERTILIZERS

(C. S. Patrick. E. E. Hall. and J. A. Riley)

During the past three years the South Carolina Experiment Station has cooperated with the Bureau of Agricultural Engineering and the Bureau of Chemistry and Soils of the United States Department of Agriculture and with a joint Committee on Fertilizer Application in a study of mechanical application of fertilizers to cotton. This work is conducted at Clemson College, at the Pee Dee Experiment Station at Florence, and at the Sandhill Experiment Station in Richland County. The fertilizer is placed at different depths in the soil and at different positions with reference to the seed by a mechanical distributor developed by the Bureau of Agricultural Engineering. Careful studies are made of the effect of the fertilizer on the germination of the seed and the early growth of the plants.

On the sandy clay loam soil at Clemson College satisfactory stands of cotton were secured with all methods of application used except when all of the fertilizer (800 pounds per acre) was applied in contact with the seed. Some delay in germination resulted when the fertilizer was placed in a band two inches in width and one inch below the seed and also when the fertilizer was mixed with the soil, although these placements did not affect adversely the final stand obtained.

On the fine sandy loam soil at the Pee Dee Experiment Station the position of the fertilizer with reference to the seed affected germination and early growth to a much larger extent. When fertilizer was applied in a two inch band in contact with the seed only a few plants came up. Poor stands were obtained when the fertilizer was placed in a two inch band one, two, three, and four inches below the seed. No injurious effects on germination and growth of the young plants occured where fertilizer was placed on each side but below the level of the sea.

On the coarse Norfolk sand at the Sandhill Experiment Station the injurious effects of the fertilizer were found more marked where the fertilizer was placed in contact with the seed or at different depths be-

low the seed. Even on this coarse soil there seemed to be little lateral movement of the fertilizer materials and no injurious effect was observed even with the concentrated fertilizer when this was placed in a band on either side of the seed.

TOBACCO EXPERIMENTS

(R. E. Currin and W. B. Rogers)

The tobacco plant is very sensitive to different soil, climatic and biological factors. Variations in these factors influence the quality as well as the quantity of the crop produced. Quality is an important factor in determining price. Research work is therefore needed to determine the best soil, fertilizer, rotation, cultural and curing practices to follow in producing large fields of high grade tobacco.

With the beginning of 1931 the organization at the Pee Dee Station was changed so as to permit Mr. R. E. Currin to devote his entire time to the tobacco investigation work. The problems connected with economic and efficient tobacco production are of sufficient importance to justify the establishment of a separate tobacco experiment station and this will be done as soon as sufficient state and federal funds are available for this purpose.

A brief report of the experiments under way at the present time is given below.

Spacing and Rate of Fertilization Test

During the past year two new experiments with tobacco were begun at the Pee Dee Experiment Station. One of these is a combined spacing and rate of fertilization test in which various rates of ammonia and potash are tried under close (15 inch), medium (22-1/2 inch), and wide (30 inch) spacing. A constant amount of phosphoric acid, all derived from superphosphate, was used on all plats. The ammonia in the fertilizers was derived in equal parts from sodium nitrate, ammonium sulfate and cotton seed meal. Two-fifths of the potash was from muriate of potash, while the remaining three-fifths was from sulfate of potash-magnesia. Fertilizer of the various formulas was applied at the rate of 1000 pounds per acre in all cases.

The crop from these treatments has been harvested but as grading has not been completed, plat yields and values per acre are not yet available. Field observations made during harvest season showed a striking delay in ripening on the high ammonia and potash plats.

Source of Ammonia Test

The better features of two old source of ammonia tests with tobacco were combined in a new test started this year. Organic and inorganic sources singly and in combination are compared. The value of urea as a substitute for the high priced organic sources of ammonia is being studied. Ammoniated superphosphate is also included. The sources

of ammonia are used in a formula consisting of three per cent ammonia, eight per cent phosphoric acid, and five per cent potash. Ammonia in the fertilizer for check plats is derived as follows: one-third from sodium nitrate, one-third from ammonium sulfate and one-third from cotton-seed meal. All the phosphoric acid is derived from superphosphate. Two-fifths of the potash is derived from muriate of potash and three-fifths from sulfate of potash-magnesia.

All treatments are replicated three times (four plats each) and all receive 1000 pounds of a 3-8-5 fertilizer per acre.

SOIL SURVEY

(In cooperation with U. S. D. A.)

A detail soil survey of every county in the state is necessary as a basis for a diversified agriculture. The State of South Carolina has never made an appropriation for this important work but had depended upon the United States Department of Agriculture to make these surveys as federal funds became available for this purpose. Several years ago the United States Congress wrote into the appropriation bill a provision placing this soil survey work on a cocperative basis and providing that no such work would be done in a state except on a cooperative basis. Since that time difficulty has been experienced in continuing this important work. In 1927 a cooperative agreement was made with the Bureau of Chemistry and Soils providing for undertaking a survey of Williamsburg County, the bureau to furnish the soil specialists and the experiment station to pay for the travel and subsistence of the workers. These expenses have since that time been paid out of the state appropriation for Agricultural research work. On this basis the Bureau of Chemistry and Soils has furnished four men for approximately six months each winter.

Under this agreement the survey in Williamsburg County has been completed and published. The field work has been completed in Greenwood and Dillon Counties and these reports are in process of publication. The survey in Abbeville County will be finished in the early part of this winter and the party will then move to Edgefield or Marion. The present plan for conducting the soil survey is very satisfactory because it permits the United States Department of Agriculture to use their specialists in the South during the winter months when it would be difficult to do soils work in the North and at the same time enables the State of South Carolina to get the surveys made at a comparatively small cost.

Experiments with Livestock

The Animal Husbandry Division has completed and published the results of three projects during this year. These publications include studies of rations for use on winter and summer forages and in dry lot for fattening hogs. These tests are undoubtedly of more practical

value to the hog feeders of South Carolina than any previous experiments conducted by this station. The general application of the information given will make a marked increase in the profits returned from hog feeding.

The purebred beef, swine and sheep are used to furnish animals for experimental work and breeding stock for the farmers of the state. The Berkshire swine herd is recognized as one of the best in the country and has furnished foundation stock for many of the leading herds in this and other states.

The herd of beef cattle is of such character that the entire calf crop is demanded to supply breeding animals for cattlemen in the state.

The two big problems in sheep production in this state are securing early lambs and controlling internal parasites. The college flock is being used to study these problems and to furnish breeding stock to farmers.

PROTEIN SUPPLEMENTS TO CORN FOR FATTENING HOGS IN DRY LOT

(E. G. Godbey)

A fourth test was conducted in 1931 comparing soybean meal and cottonseed meal as protein supplements for fattening hogs in dry lot when fed in combination with fishmeal and yellow corn. Hand and free choice methods of feeding were compared with each supplement.

The free choice feeding produced slightly faster but more expensive gains than hand feeding when the soybean supplement was used. When the cottonseed meal supplement was used both methods of feeding produced about the same rate of gain but the free choice fed hogs used less supplement and made slightly cheaper gains. The cottonseed meal mixture, either hand fed or free choice fed, produced faster and cheaper gain than the soybean meal mixture.

HAND VERSUS FREE CHOICE FEEDING OF CORN AND FISHMEAL

(E. G. Godbey)

A fourth test was conducted comparing hand and free choice feeding of corn and fish meal in dry lot and on barley forages for fattening hogs. Hand feeding produced more rapid and cheaper gains when the hogs were fed in dry lot. When the hogs were on forage the two methods of feeding produced about the same daily gain but the cost of the gain was less when hand feeding was practiced.

The use of forage increased the gain and decreased the cost with each method of feeding.

The results of this test were averaged with those of three previous tests and published as South Carolina Experiment Station Bulletin 277. This may be had upon request.

A STUDY OF THE RESULTS OF INTENSIVELY INBREEDING BERKSHIRE SWINE

(E. G. Godbey)

The inbreeding experiment started in 1927 is being continued with the more intensely inbred hogs and with some litters that are not inbred.

Seventy-three litters (651 pigs) have been weighed and measured. The weight, height, length, heart girth, size of bone, depth of heart and spring of hib have been taken at birth and every seven days until weaning, (8 weeks).

No correlations have been made since the 1930 and 1931 pigs have been added. Correlations made previous to that time showed no relation between birth weight and the degree of inbreeding, but a definite correlation between weaning weight and the degree of inbreeding.

THE INFLUENCE OF SOYBEANS WHEN FED WITH LIMITED AND FULL RATIONS OF CORN AND CORN AND TANKAGE ON THE HARDNESS OF FAT IN HOGS

(E. G. Godbey)

In the summer of 1930 six lots of hogs were put on a test in which forage was furnished by green soybeans and alfalfa. Corn and tankage was fed in both limited and full amounts during the first part of the test and full fed free choice during the latter part of the test.

Each of the forage lots made a faster and cheaper gain than the check lot.

The hogs on soybeans made faster and cheaper gains than those on alfalfa. Hogs receiving 2 1/2 per cent corn and tankage (14:1) on green beans to 100 pounds weight and then corn and tankage free choice on green beans to 200 pounds made faster and cheaper gains than the other lots fed in this test.

At the close of this feeding test these hogs were shipped to Beltsville, Maryland, where detailed carcass studies were made by the Bureau of Animal Industry workers. The hogs that made the fastest and cheapest gains also gave the best carcass gradings.

GREEN SOYBEAN FORAGE FOR FLUSHING EWES

In June 1931 thirty-three Southdown and Hampshire ewes were divided into two groups. One group was put on green soybean forage and the other on good permanent pasture.

The object of this test was to determine whether or not green soybeans would flush ewes sufficiently to cause early breeding. Two ewes in each group were bred in July. Six ewes in the soybean lot and two in the patsure lot were bred during August. Thirteen ewes in the soybean lot and ten in the pasture lot were bred before September 15th.

This test will be repeated next year, using a larger number of ewes.

Research in Plant Physiology and Plant Pathology

AN ABNORMAL CONDITION OF OATS AND COWPEAS CAUSED BY INSUFFICIENT MANGANESE IN THE SOIL

(W. B. Albert)

An abnormal condition of oats was noted in certain fields in Florence and Darlington Counties early in the season of 1931. Prior to the heading of the oats, bright yellow coloring of the leaves, which was quite characteristic and striking, was noted in patches ranging from a few feet in diameter to appreciable portions of the field. Because the patches of oats were sharply defined in area the presence of a soil condition was suspected. Samples of abnormal oats and neaby growing normal oats were analyzed and the abnormal oats were found to be very much lower in manganese content. The soil reaction, although still acid, was distinctiy less so than the soil on which normal oats were growing.

Some soil was then transferred to pots and treated with lime at the rate of 3000 pounds per acre in order to accentuate any manganese deficiency. Manganese sulphate at the rate of 100 pounds per acre was added to some of the limed and check pots. all of which were then planted to cowpeas. Other pots were reserved for checks.

The results were definite and striking. After about four weeks a definite mottling was observed in the leaves of plants in the pots of soil that had produced abnormal oats. The cowpeas growing in pots of similar soil to which manganese sulphate had been added showed no trace of mottling. A severe chlorosis that was corrected by applications of manganese sulphate was present in the cowpeas growing in pots that had received 3000 pounds of lime per acre.

It has been definitely shown that, as far as cowpeas are concerned, applications of 100 pounds per acre of manganese sulphate will correct this soil condition. The optimum amount of manganese sulphate, or other manganese compounds to apply to such deficient soils still remains to be worked out.

CONCENTRATION OF SOLUBLE ARSENIC AS AN INDEX OF ARSENIC TOXICITY TO PLANTS

(W. B. Albert and C. H. Arndt)

It has been found that the amount of arsenic present in a field soil is not necessarily related to the toxicity towards crops. Some fields on which normal corps can be grown may contain as much arsenic as a nearby field on which similar crops may be a complete failure. The concentration of soluble arsenic in soils, as measured by collodion bag dialysates, is usually a more reliable index of arsenic toxicity than is the total arsenic present in the soil. Considerable study of the factors responsible for the ability of soils to render arsenates harmless to arsenic sensitive crops has been made and while the question has not

been entirely answered, the results indicate that liming and fertilizing practices, along with the iron and clay compounds of the soil, play an important role. More detailed results of these studies are reported under the section of this report entitled "Experiments with Feld Crops and Fertilizers."

Some indications as to what concentrations of arsenic are harmful to cowpeas were obtained from a study at the Pee Dee station of cowpeas grown in similar nutrient solutions except for the addition of varying amounts of arsenic. It was noted that the addition of one part per million of arsenic definitely retarded top and root growth, particularly the latter. A concentration of one part per million of soluble arsenic, as measured by collodion bag dialysates, in some of our most heavily arsenated fields is not unusual.

Further studies have been made at Clemson College to determine the effect of arsenicals upon the growth of cotton plants in water cultures. Preliminary results would seem to indicate that a concentration of M/40,000 potassium arsenate (approximately 2 p.p.m.) in a basal nutrient solution is sufficient to greatly reduce the growth of the plant in a 66 day growing period. The relative growth in various concentrations of potassium arsenate and arsenite, indicate that the latter is approximately four time as toxic as the former. One of the interesting results of this study is the accumulation of data which seem to show that under some conditions certain concentrations of arsenicals which are sufficient to greatly reduce the growth of the tops may stimulate root elongation.

GERMINATION OF COTTON SEED AND GROWTH OF SEEDLINGS AT LOW TEMPERATURES

(C. H. Arndt and Geo. M. Armstrong)

Certain experimental cotton plantings have indicated that an early seeding will give increased yields over later seedings if a fair stand of plants can be secured. It is generally recognized that in early plantings the germination of the seed is less and that frequently the stand of cotton is lost during the seedling period even if satisfactory germination is secured. For some years studies have been in progress to determine the cause of this seedling loss with the object of finding some means to reduce it.

Such seedling losses are usually associated with cool rainy weather. To determine the relation of temperature to these losses, cotton was germinated and grown during the seeding stages in constant temperature tanks and pots in the greenhouse during the winter of 1930-31. Soil temperatures of 18 degrees C. and 25 degrees C. were selected as the two temperatures to be used in this study, the lower temperature being representative of a temperature at which cotton grows very slowly; the higher temperature being favorable for a fairly rapid growth. Most of the seedlings which developed at the lower temperature showed typical damping-off symptoms. The lesions were, however, not typical of those produced by the fungi which cause damping-off.

Under field conditions seedlings thus injured usually develop abnormally and their appearance is well described by the term "big shank", which is the name commonly used by the farmers to designate this type of injury. A microscopic examination of such seedlings invariably showed nemas to be present. Fungi were frequently associated with these lesions; but in no case was there any evidence to indicate that they were the primary cause of the damage. Similar lesions appeared on the seedling at the higher temperature. Here, however, the seedlings were only occasionally severely injured; apparently because of the more rapid growth at the more favorable temperature.

In order to determine to what extent these observations made in the greenhouse might apply to field conditions and further to determine whether any important varietal differences might exist in resistance to unfavorable temperatures and to the pathogenetic organisms at such temperatures, early and late plantings of 52 selected varieties and strains of cotton were made in the spring of 1931 at Clemson College and at the Pee Dee Experiment Station. In the early planting from 80-90 per cent of the seedlings were killed in the early stages of their development, in the later plantings from 20-40 per cent. All available evidence seems to indicate that nemas were responsible for most of the injury.

Seedlings which developed from seedlings made after the first week in May at Clemson College showed a loss of less than 5 per cent from nema injury, although typical nema lesions were not uncommon; thus, substantiating the observations made in the greenhouse as to the lesser damage at temperatures favorable for a rapid growth of the cotton plant. Further studies are planned of the life history of this nema and also a more accurate determination of the relation of soil moisture and temperature to the injury of cotton seedlings by it with the object of finding some means of reducing this loss. All of the data available at present would seem to suggest that to eliminate loss through nema injury cotton seeding should be delayed until the mean minimum temperature is likely to approximate 60 degrees F., and the mean maximum 75-80 degrees F. This would be equivalent to seeding in most years about the second week in May at Clemson College.

Several of the strains of the group which were seeded early to test their ability to germinate and grow in unfavorable cool weather, have made good growth under such weather conditions and have shown a fair resistance to the pathogens which are most active at such low temperatures (10-20 degrees C.). Surviving plants of these strains are being selfed and the seed saved for further tests next year. At present it is not clear to what extent the survival of the plants has been due to disease escapement due to differences in the soil and other factors, or to their ability to make better growth during cool weather and thus show a greater resistance to injury by pathogenic organisms.*

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*A more complete report of these investigations appeared in **The Plant Disease Reporter** for July 15, 1931.

EFFECT OF ENVIRONMENTAL FACTORS UPON THE AMOUNT OF INJURY TO COTTON SEEDLINGS BY THE NEMA A. PARIETINUS

(C. H Arndt)

In the discussion of the effect of environmental factors upon the amount of injury to cotton seedlings by the nema, **A. parietinus**, it has been noted that unfavorable conditions for the growth of the plant greatly increased the damage by this organism. Further evidence that this may be true was secured in Greenhouse studies during the past winter on soil from the Pee Dee Experiment Station which had apparently been poisoned by applications of calcium arsenate and a similar soil which had not received any arsenical. In the cool section of the greenhouse where the temperature range was 18-20 degrees C., the plants in both soils were severely injured by this nema. The average seed germination was 50 per cent greater in the soil which had not received any arsenic than in the one to which arsenic had been applied. In both soils the seed germination and nema injury was less at a soil moisture content of 50 per cent of the water holding capacity than in the soil at higher moisture content. In the warmer section of the greenhouse (temperature 25-30 degrees C.), the germination in both soils was similar, as also was the number of seedlings attacked by nemas. The seedlings in the soil which had not received any arsenic soon outgrew the injury and at the end of two months showed little evidence of nema injury. The plants in the other soil, however, were much smaller and still showed severe nema injury at the end of two months. In this arsenic containing soil, the plants made a very good growth when the soil was heated with steam or treated with toluol. Most of the plants in both soils had galls of the root nema on their roots.

THE INTERNAL INFECTION OF COTTON SEED

(C. H. Arndt)

In the study of the germination of the various varieties of cotton seed, great differences in the percentages of germination were noted. It was thought probable that internal infection of the seed might be responsible for these differences and certain varieties were germinated under sterile conditions to determine the pathogens which might be present. The seed was delinted with sulphuric acid, washed in sterile water saturated with calcium carbonate, washed in sterile water alone, and then germinated on sterile moistened filter paper in petri dishes. The percentage of internal infection ranged from 5 to 24.

The relative percentages of the various pathogens were approximately as follows:- A yellow bacterium (B. malvacearum), 20 per cent; Fusaria (as determined by Dr. C. D. Sherbakoff, **F. Moniliforme; F. semitectum; F. reticulatum**), 35 per cent; mixed infections of bacteria and fungi,

10 per cent; Alternaria sps., 15 per cent; a colorless bacterium, 10 per cent; undetermined fungi (in part Diplodia gossypina, Rhizopus sps., etc.), 10 per cent. Experiments are now in progress to determine the pathogenicity of these organisms.

These results and similar previous reports by others, would seem to indicate that internal infections may play an important part in the dispersal of some of the common diseases of the cotton plant as well as reduce the germination of the seed. They further emphasize the importance of testing all seed for germination.

A STUDY OF THE LENGTH AND STRUCTURE OF COTTON FIBRES

(H. W. Barre, G. M. Armstrong, and C. C. Bennett)

It is known that the fibers on a cotton seed are of different lengths and our arrays have not revealed as much as thirty per cent of any one length present in a given sample.

A study is being made of the effect of general growth conditions, different fertilizer applications, and other ecological factors as influencing the length of lint. The same strain of cotton has been grown under very favorable conditions in the greenhouse at Clemson College and under less favorable conditions in the fields at Clemson College and Florence during the seasons of 1929, 1930 and 1931. Usually an array of the fibers from each boll has been made on Baer or Johannsen sorters in which the fibers are separated into groups varying by 1/16 of an inch.

The fiber arrays of individual seed suggested the possibility that the 24 to 26 groups of different lengths which are obtained may have been derived from the fibers which grow from the seed coat daily i.e., each group may have been produced roughly in a period of 24 hours. In an effort to explain such array curves as a basis for future studies of the probable effects of environmental factors, the chief points under investigation recently have been the increase in length of the longest fibers, the boll growth in diameter and volume, seed growth in volume and surface area, and variation of fibers in bolls from different positions on the plant.

Balls, and Hawkins and Serviss have stated that cotton fibers elongate for 20 to 25 days after which elongation ceases and thickening begins. We found the fibers to grow very rapidly for the first 7 days and then at a less rapid rate to 24 to 27 days. The fibers were still elongating at a slow rate at 30 days when our measurements ceased. The fibers at the large end of the seed were appreciably longer than those at the tip end. To determine the distribution of the different lengths, the fibers were arrayed from a series of bolls from 25 to 50 days of age. It was impossible to array the fibers from bolls younger than 25 days. Even though the longest fibers have practically ceased growth at 30 days, the fiber arrays show that elongation of other fibers must continue until maturity of the boll at 50 days. For example, at 25 days

of age only 27 per cent of the fibers are one inch in length or longer, at 38 days of age 35 per cent are one inch or longer and at 50 days 75.8 per cent are one inch or longer. The shorter fibers at 25 days of age were not due to breakage of immature fibers as shown by a microscopic examination of large numbers of the fibers of different lengths.

The volume and surface area of the seed increases only very slightly after 25 days of age, which might indicate that few new fibers are produced from the surface area after this time. To test the point, the number of fibers per seed at 25-28-32-38-46 and 50 days were counted. The numbers per seed were somewhat variable though there was no indication of increase in number with age. All these points lead to the conclusion that the changes in the distribution of the different lengths of fibers from 25 to 50 days must be due to the increased growth in length of many of the shorter fibers.

The weights of 300 fibers of each length revealed that the short fibers are heaviest per unit length, or expressed differently, the longest fiber is the finest fiber. This same relation holds in the boll at 25 days of age as well as in one 50 days of age. The effect of distance from the main stem on the length and distribution of fibers within the boll was studied by arraying all the bolls from 14 limbs containing 3 or more bolls per branch. The outer bolls have a larger percentage of short fibers and show less uniformity in distribution than do the bolls at first position on the limbs.

One plant of the 1930 crop has had every boll arrayed and a count made of the number of fibers per seed in each boll. The number of seed per boll, the number of motes, the weight of seed, the weight of lint and the per cent of lint have also been obtained. The percentage of lint of a particular cotton is a factor of considerable importance to the average cotton grower. This factor is a composite one which is variable from season to season or from boll to boll. One boll produced 29.4 per cent lint while another on the same plant produced 37 per cent lint. That high percentage of lint is usually associated with short fibers is well known. Our arrays indicate that bolls with practically the same per cent of lint as for example, No. 3-1 with 35.4 per cent and No. 4-1 with 34.3 per cent may vary considerably in the uniformity of the fibers. Boll No. 3-1 has more long fibers and a more uniform staple than boll No. 4-1 and a total of 2,730 more fibers per seed. Apparently, the greater number of long fibers with less unit weight in boll No. 3-1 are balanced by the greater number of short fibers with a high unit weight in boll No. 4-1 in such a way that the same lint percentage is obtained in each boll.

When pulling the fibers from the seed, we have noted rather striking variations in fuzziness of the seed coat. To measure this factor, eight samples of seed varying from rather smooth seed practically devoid of fuzz to seed with extra heavy fuzz have been used as standards numbered from 1 to 8.

One hundred and fifty two bolls of the first crop from seven plants in the greenhouse in 1929 showed an average grade for fuzziness from 6.25 to 6.53 for the first five positions along the limb. Sixty bolls of the second crop from the same plants had much less fuzz, the grade being 4.72 ± .13. Seed from the same lot used in 1929 were planted in the greenhouse in June 1930. This late planted cotton produced many rather smooth, nearly fuzzless seed, most of which have not been graded for this factor. Twenty-nine bolls on the first position along the branches from 20 plants, however, show a grade of 3.86 ± .14 for fuzziness. All the flowers were self-pollinated in these experiments. This variation in the degree of fuzz from physiological causes is of interest in view of the genetic studies of this factor which have been published.

PLANT DISEASE SURVEY

(In cooperation with U. S. D. A.)

The Plant Disease Survey was conducted, as in the past, in coopeartion with the Bureau of Plant Industry of the United States Department of Agriculture. We make periodical reports and a seasonal summary of the plant-disease conditions in this state and in return receive summaries of the situation over the whole country.

There have been no severe outbreaks of disease among the vegetable-garden crops this year which has apparently been favorable for good yields of most crops. The most common trouble has been a collar-rot, shank-rot or sore-shin, not only of some vegetable crops but also of soybeans, ornamentals and tobacco. The fungus, Sclerotium rolfsii, which has been responsible for these troubles, has been more prevalent than for several years.

A special tobacco disease survey has been made for two years, which has included the inspection of a fairly large number of plant beds in the spring and a later field inspection. Very few diseases in tobacco seed beds were found in 1930 or 1931. Damping-off seems to cause the most trouble. Fifty-seven fields in five counties were inspected during the growing season of 1931. The most outstanding losses were caused by root-knot and sore-shin. Root-knot damage was found in 35.9 per cent of the acreage with losses ranging from a trace to 50 per cent. Sore-shin was found in 38 per cent of the acreage with losses varying from a trace to 20 per cent. The losses from mosaic were decidedly less than in 1930, the greatest estimated damage in any field this year being 15 per cent. Potash hunger which was so evident in 1930 was seen in an outstanding case in only one field in 1931. Sand drown was found in five fields and fusarium wilt in four fields.

The phony peach disease which has proven so destructive in Georgia was found in ten counties of the state and the owners of the 43 diseased trees agreed to the destruction of them. It is hoped that further surveys

can be made next year and that this disease may be promptly eradicated since it appears that no great number of trees are affected. During the phony peach survey, 13 trees affected with the more destructive rosette disease were also destroyed.

Brown-rot of peach in home orchards seems as abundant as usual. The damage from bacterial spot in commercial peach orchards has been declining for the past two years.

The number of specimens of pecan diseases received indicates that scab and black-pit are fairly abundant though some surveys have indicated that the scab is probably causing less loss than last year.

Research Work in Chemistry

The work of the Chemistry Division may be grouped into three parts.

1. Research work in connection with projects conducted by the Chemistry Division.
   (a) Mineral constituents of foods and soils of South Carolina.
   (b) Factors influencing the iodine content of plants.
2. Research work in which the Chemistry Division is jointly working with other Divisions.
   (a) Factors influencing the oil content of cotton seed.
   (b) Effect of fertilization on the protein content of pasture grass.
   (c) Vegetable protein in laying and breeding rations.
3. Miscellaneous chemical work necessitated by projects in which the chemistry division is not directly interested.

Over 1000 samples have been received during the year. These have been analyzed for various things, but most of the work has been on mineral and nitrogen determinations.

A STUDY OF THE RELATIONSHIP BETWEEN THE MINERAL CONTENT OF THE SOIL AND PLANTS GROWN ON THE SOIL

(J. H. Mitchell)

Mineral elements in feeds are of considerable importance. In many instances mere traces of certain elements play a very impotrant part in the development of plants and of animals consuming those plants.

The first phase of this investigation was designed to determine the relationship between the mineral content of the plant and the soil, and then study ways in which the mineral content of the plant might be increased.

Various combinations of fertilizers were used in these experiments. Some areas were limed and some unlimed. In addition to the common plant foods such as acid phosphate, the potash salts, nitrate of soda, ammonium sulphate, etc., several rare elements such as copper sulphate, zinc sulphate, manganese sulphate and nickel sulphate were used.

The phosphorus content of plants is increased by fertilization. In the case of legumes such as clover and vetch the addition of lime apparently aids in the assimilation of phosphorus.

Ammonium sulphate applied at the rate of 300 pounds per acre increased the nitrogen content of rye, oats and clover from 20 to 40 per cent. Where lime was used a much smaller increase was noted. Somewhat similar results were obtained with nitrate of soda.

No positive results have been obtained so far from the use of copper, nickel, manganese and zinc salts.

FACTORS INFLUENCING THE IODINE CONTENT OF PLANTS

(J. H. Mitchell)

A study is being made of the effect of iodine salts on the iodine content of pasture grasses. Severay plots were treated with potassium iodide and potassium iodate. The chemical analysis of these has not been completed. Results in 1930 indicate that the iodine content of oats, beans, turnips and beets may be increased by the application of these materials.

FACTORS INFLUENCING THE OIL CONTENT OF COTTON SEED

(H. P. Cooper and J. H. Mitchell)

About thirteen varieties were used in the experiment this year. Sixty two samples were analyzed. The seed were split, the meats removed and weighed and the percentage of oil and moisture determind in the meats.

From the results available at this time it appears that oil content is more closely associated with variety than fertilization.

Experiments in Dairying

The research projects reported here and others in progress along dairy lines have been selected to furnish timely information to those interested in dairy farming. The improved market facilities becoming available and the increased need for diversification are resulting in evidence of expansion of dairy interest in the state.

Facilities recently made available are greatly assisting in the research work of the division especially along nutrition lines.

CORN SILAGE vs. GROUND CORN FODDER FOR MILK PRODUCTION

(J. P. LaMaster and E. C. Elting)

During the winter of 1930-31 a feeding trial was conducted to compare the value of corn silage with ground corn fodder* for milk production. Six cows were divided into two groups and fed by the double reversal method to determine the relative value of these feeds when supplemented with soybean hay and a suitable grain ration.

The trial extended over three 28 day experimental feeding periods with 10 day transitions.

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*"Ground corn fodder" as here used refers to the product obtained by grinding the entire plant, except root.

The silage and fodder were fed in such quantities as to furnish equal amounts of dry matter per hundred pounds of live weight for each group. This ratio figured out approximately to one pound of fodder to each three pounds of silage.

From the tabulated data on this trial it is indicated that silage and fodder have practically equal feeding value when compared on the dry matter basis.

The only significant difference in these feeds was that the silage proved to be more palatable as shown by the relish with which it was consumed and the tendency of cows on the fodder ration to refuse small portions of this feed at times.

SUPPLEMENTARY FEED REQUIREMENTS OF COWS ON PASTURE

(E. C. Elting and J. P. LaMaster)

At the beginning of the 1930 grazing season a test was started to determine the nutrients received by cows from pasture grazing. The pasture was typical of unfertilized permanent pasture sod of the Piedmont section, consisting largely of Bermuda grass with some Dallis grass, lespedeza and, in the lower ground, carpet grass forming the balance of desirable flora.

The pasture was quite heavily stocked, carrying slightly more than one animal per acre of pasture.

Ten cows were used in this test. Careful records of milk and butter-fat production, live weight, and supplementary feeds supplied were kept from May 6th to October 13th. The supply of supplementary feed was adjusted each twenty days, based on the live weight and production of the animals.

The very limited rainfall during the 1930 growing season was unfavorable to good pasture growth, so the results obtained undoubtedly are below the average which could be expected over a number of years.

A summary of the total feed requirements of the animals, the supplementary feed allowed, and the nutrients obtained from pasture are presented below:

	Pounds
Average Daily Milk Production per Cow	19.7
Daily Supply of Digestible Nutrients Required per Cow	14.5
Nutrients Supplied by Barn Feeding Daily per Cow	10.8
Nutrients Obtained from Pasture Gazing Daily	3.7
Per Cent of Nutrients Obtained from Pasture	25.2
Average Gain in Live Weight per Cow for Season	6.8

From the above data we conclude that, under the conditions similar to those existing during the 1930 season, such pastures cannot be expected to maintain profitable milk production without substantial barn feeding.

THE VALUE OF COTTONSEED MEAL AS A SUPPLEMENTARY FEED FOR DAIRY CALVES

(E. C. Elting and J. F. LaMaster)

This project is a continuation of work previously reported on the value of various high protein supplements in the ration of dairy calves weaned from milk at 60 days of age.

The cottonseed meal studies were started in August, 1930.

The general plan of feeding calves in these studies consisted in allowing the calves a full feed of whole milk to 40 days of age. At that time the milk was gradually diluted with warm water and the amount of milk reduced until the calves were completely weaned from milk at 60 days. The feeding of two gallons of warm water per day was continued after the milk was eliminated. The grain mixture to be studied was kept before the calves continually after they were a few days old and the amount of grain was increased as rapidly as the calves would consume it up to a maximum of five pounds per day. The calves also had free access to good quality hay at all times.

Two grain mixtures have been used to date in these experiments:

The first consisted of

34 pounds of ground yellow corn
35 pounds of ground oats
20 pounds of cottonseed meal
10 pounds of skimmilk powder
1 pound s of salt

This will be referred to as Grain Ration A.

The second consisted of

39 pounds of ground yellow corn
40 pounds of ground oats
20 pounds of cottonseed meal
1 pound s of salt

This will be referred to as Grain Ration B.

Three groups of calves have been raised to six months of age in these trials. These included a total of 14 calves, all females, of the Guernsey, Holstein, and Jersey Breeds.

Group I received Ration A to six months of age.

Group II received Ration A to three months of age and Ration B from three to six months of age.

Group III received Ration B to six months of age.

Every animal stated on these experiments was carried to completion. No scours or other abnormal symptoms were encountered and all calves were in excellent physical condition at six months of age.

The results lead us to conclude that cottonseed meal has no detrimental effect on young calves when supplemented with good quality hay and that it is a valuable source of protein for young calves weaned from milk at an early age.

WHOLE COTTON SEED FOR DAIRY COWS

(J. P. LaMaster and E. C. Elting)

Due to the low price and the low exchange value of cotton seed for cottonseed meal during the last two years, some observations and tests have been made to determine the possibilities of cotton seed in the ration for dairy cattle.

The first test was on the preparation of the seed for feeding. It was practically impossible to grind cotton seed with an ordinary hammer type feed mill. The burr type mill ground the seed rapidly and thoroughly without difficulty. The ground seed were extremely bulky, oily, and difficult to mix with other ingredients.

On account of the difficulty experienced in preparing a ration with ground seed, a test was made to determine the efficiency with which dairy cows would utilize whole cotton seed.

Three tests were made utilizing various amounts of seed and in conjunction with other feeds.

All feces were collected over a three day period and washed to recover any seed which passed through the digestive tract whole.

The results show that when whole cotton seed are fed to dairy cows the loss due to whole seed passing through the digestive tract is negligible. Due to the difficulty in grinding cotton seed and in combining the ground seed with other feeds and also the possibility of feeds mixed with ground seed becoming rancid quickly due to the high oil content of the seed, it is recommended that when cotton seed are fed to dairy cattle they be fed whole.

A STUDY OF CALCIUM AND PHOSPHORUS ASSIMILATION BY DAIRY COWS

(J. P. LaMaster, E. C. Elting and J. H. Mitchell)

Since our last report, improved facilities have been made available for determining calcium and phosphorus assimilation. With these improved conditions a more intensive study is being conducted along this line.

This year two trials have been completed. One of these was on two mature Holstein cows dry and near the end of their gestation periods. The other was conducted on the same cows during the third month of the lactation periods following the first trial.

The ration fed preceeding and during the first trial consisted of corn silage, chopped soybean hay and a grain mixture composed of equal parts by weight of corn and cob meal, ground oats, wheat bran and cottonseed meal.

After these two cows calved, they were placed on a ration consisting of corn silage, soybean hay, beet pulp and a grain mixture composed of 2 parts corn and cob meal, 2 parts ground oats, 2 parts wheat bran, 1 part linseed oil meal and 1 part cottonseed meal. These cows were

kept in dry lot at all times, and both had been maintained in heavy flow of milk up to and including the second trial.

The results show that rations generally considered as satisfactory for good dairy feeding conditions maintained positive balances for both calcium and phosphorus during late gestation and the heavy milking period following.

ADVANCED REGISTRY TESTING

(J. G. Moxon)

The supervision of Advanced Registry records made on purebred dairy cattle by breeders in the state is a regular function of the Dairy Division.

Two testers are employed to visit farms of breeders who desire this work, and a report is made by the test supervisor to the Clemson College office. After these reports are checked and verified they are forwarded to the breed association concerned and become official reports. The experiment station is the agent selected in each state to supervise these tests because of its disinterested relation and the confidence the public has in a record made under this plan. The breeder making the test pays all expenses connected with this work, except the salary of the state superintendent of Advanced Registry testing which is paid from state appropriation.

During the year, 34 breeders have had 210 cows on test. These breeders finished 131 records. This is an increase of 6 breeders and 54 records over last year.

The 9 Jersey records averaged 8747 pounds of milk and 456.77 pounds of butterfat. The 27 Holstein records averaged 13743.5 pounds of milk and 446.7 pounds of butterfat. The 95 Guernsey records averaged 10069.6 pounds of milk and 505.2 pounds of buttrefat.

The largest fat record during the year was made by a Guernsey cow, Max's Besse of Oak Grove Farm 144298, owned by Mr. N. G. Roosevelt of Monks Corner, S. C., with a record of 14,468.6 pounds of milk and 803.1 pounds of butterfat in Class A. A Holstein, Kathleen Posch Johanna 1144941, owned by Mr. V. M. Montgomery of Spartanburg, S. C., finished with the largest milk record, 24,292.3 pounds of milk and 746.4 pounds of butterfat in Class B.

Studies of Insect Pests

FEATURES OF THE YEAR

In general 1931 has brought less complaint of damage by insects than has been true in most years. While a few of our insect pests have been more destructive than usual, a considerably larger number have been less destructive than is their custom.

The following appear to have been more destructive than usual:- Squash bug; chinch bug; codling moth; and grasshoppers in general. Chinch bug and grasshoppers are known to be likely to give trouble

during or following dry years such as we had in 1930. In this connection it may be remarked that a severe outbreak of grasshoppers occurred during the year in some of the mid-western states. Squash bugs were much more abundant and destructive at Clemson College than we have ever before experienced.

The following appear to have been less destructive than usual:- Mexican bean beetle, especially the last half of the summer; corn billbugs; Colorado potato beetle; cotton flea hopper; thrips, on cotton; Oriental fruit moth; curculio; cotton boll weevil; and, tomato fruit worm. In regard to the last, it is noteworthy that while the tomato fruit worm was unusually scarce in our test plantings of tomatoes at Clemson College, yet the same species of insect in its role as the corn ear worm was reported to be more destructive than usual in much of the eastern United States.

BOLL WEEVIL CAMPAIGN

For the fourth consecutive year a campaign was conducted in interest of boll weevil control. A special class was conducted at Clemson College during the spring under general supervision of Dr. F. H. H. Calhoun and the young men thus prepared were available for employment by counties, organizations or by planters. During the summer a series of ten weekly statements were issued to the press which described the weevil conditions and movements in various counties these statements being usually prepared in the office of the Director of Research from data sent in by field men working in cooperation with the South Carolina Experiment Station and the Bureau of Entomology.

Owing to the generally unfavorable conditions in the cotton industry, less actual work in weevil control was accomplished than has been usual in recent years.

JAPANESE BEETLE IN SOUTH CAROLINA

The reports of the State Crop Pest Commission (which is closely allied with the Experiment Station) have often mentioned the Japanese beetle as a pest which might soon gain a foothold within the state. It was first found in New Jersey in 1916, since which time it has been spreading north, south and west.

During June 1931, agents of the United States Department of Agriculture operating at Charleston took four living specimens of Japanese beetle in the baited traps which are used to determine their presence in lightly infested areas. This destructive beetle develops from grubs which live in soil, and we are officially advised that it is desirable to treat about 23 acres of soil in Charleston the coming autumn, and arrangements are now (September, 1931) under way to this end.

THE SOUTHERN CORN STALK BORER

(O. L. Cartwright)

Comparative data have been obtained on the life history of **Diatrea zeacolella** Dyar, the Southern corn stalk borer, at Clemson College and at Florence. During 1931 the difference in time between initial appearances of comparable stages of the borers life cycle have been from five to eleven days. The first pupation occurred at Florence April 28, eight days before pupae were found at Clemson College. First emergence of moths at Clemson College occurred May 18, eleven days later than at Florence. Peak emergence from hibernation came June 1 at Florence, June 21 at Clemson. All phases of the insect's life cycle were later at Clemson College.

Three general emergence periods of adult moths were observed both at Florence and at Clemson although the third emergence at Clemson this year was comparatively very small. A much heavier emergence took place at Florence. Trap light collections verified laboratory observations. A large percentage of first generation larvae at Clemson entered hibernation and a very large percentage of the second brood did likewise. Seventy-seven percent of the larvae under observation from eggs of the first generation laid on or after July 6 assumed overwintering conditions and prepared for hibernation. At Florence practically one hundred percent of the first generation larvae completed their life cycle.

The incubation periods on 35,000 eggs, duration of pupal periods and other life stages were checked against the varying conditions of temperature experienced through the season. Clemson College pupae producing first flight moths averaged 19 days for their pupal periods, with a maximum of 28 and minimum of 13, second emergence pupae averaged 11.96 days, and the third averaged 13.66 days. Oviposition at Clemson for 121 cages averaged 294 eggs per female with a maximum record of 627 eggs.

Considerable time devoted to the search for host plants other than corn resulted in finding two additional hosts. The larger corn stalk borer was found in the field feeding in sorghum and in a species of grass, **Paspalum scrobiculatum.**

The greatest overwintering population of the borer yet found in South Carolina was discovered at Florence during the winter of 1930. This field showed 100 per cent of the stalks injured, 90 per cent containing living borers and a population of 3150 larvae per thousand stalks.

THE CORN BILLBUG

(O. L. Cartwright)

Studies of the life history of the corn billbug **Calendra callosus** at Florence during the year have revealed the fact that these insects are able to live through two years and lay eggs throughout two growing seasons. Cages started with adults gathered from the field in the spring

of 1930 produced eggs throughout the growing season of 1931, their second year of oviposition, and are now in hibernation for their third winter. Quite likely these adults were produced from eggs laid in June or July of 1929. We know of no other species of insect whose life cycle includes oviposition periods in two successive years, whose adult life and functions are so extended.

MEXICAN BEAN BEETLE

(F. Sherman)

The Mexican bean beetle emerged in considerable numbers in the spring, and these overwintering adults and the larvae which hatched from their eggs did a considerable amount of damage, yet by the time these larvae matured to beetles the heat and dryness of summer had so prevented development that for the remainder of the season the insect was less destructive than usual. The first eggs had been found in the field on June 3rd.

Hibernation—In late September 1930 two large hibernation cages with dead leaves, etc., inside were placed in a **sheltered location in a** wooded ravine, and stocked with 500 beetles each, 1000 in all. In spring of 1931 the first of these beetles became active on April 13. All beetles found active from day to day were removed from the cages and recorded. Emergence in these cages continued until June 17 by which time 343 out of the 1000 had emerged, thus showing a survival of more **than 33 per cent** of those placed in hibernation in this sheltered situation.

In late September 1930 a similar cage with similar material inside was placed in an **exposed location on top of a hill,** and was stocked with 500 beetles. In this exposed location the first beetles became active on May 22, and the last to emerge were out on June 14,—and out of the 500 only 10 emerged, thus showing a survival of only 2 per cent in this exposed situation.

In view of the fact that our midsummer weather seems often to control the Mexican bean beetle to a large extent, and that much of the damage is inflicted by the overwintering adults and their immediate progeny, it appears that hibernation is a highly important factor, and these studies are designed to ascertain the conditions which are most favorable, and least favorable, for the successful hibernation of the beetles.

Tests of Remedies—Based on the finding of previous years as set forth in bulletins and reports of this Station, tests of materials for control of the Mexican bean beetle were made with three materials; namely, magnesium arsenate, calcium arsenate and barium fluosilicate, using these mixed with hydrated lime as dry dust applications,—and also mixed in water as liquid sprays. Of these, our results favored the use of magnesium arsenate, with which we had good results using it one pound to three pounds of lime as a dust,—or, one pound to 50 gallons of water used as a liquid spray.

Eastward Spread—During August (1931) the usual scouting was done to ascertain the line of advance of the Mexican bean beetle for the year, and the accompanying map shows the record of its eastward spread since its invasion of the western part of the state in 1921. We found that its only noticeable extension in 1931 was in the counties of Dorchester and Berkley in which there was a noticeable advance. Both of these counties had been reached before, and we can repeat the statement of last year that four counties have not yet been invaded; namely, Charleston, Beaufort, Jasper and Hampton.

POTATO SPRAYING

(F. Sherman)

An experiment was entered into early in the season of 1931 to test the spraying and dusting of white ("Irish") potatoes with a view of determining whether liquid spraying with standard poisoned Bordeaux mixture (using the Colorado potato beetle largely as an index as to the time of spraying) would be profitable.

The plots were small, each consisting of 4 rows each 107 feet long. The variety was Irish Cobbler. All were planted about February 1st, the rows 3 1/2 feet apart. Five treatments were given to the dust-plots, while the plots for liquid spraying were given four treatments. On June 18 nearly all foliage was dead though the rows sprayed with Bordeaux mixture seemed to have more green. The difference was not as marked as it had previously been.

The potatoes were harvested about June 25 and the yield from each plot was graded (into "firsts" and "seconds"), measured, and calculated on acre basis. The lowest yield was from the plot which received no treatment and was 71 2/3 bushels of "firsts" and 20 bushels of "seconds", or a total 91 2/3 bushels per acre. The highest yield was from the plot sprayed with poisoned Bordeaux mixture and was 81 1/3 bushels of "firsts" and 23 1/4 bushels of "seconds", a total of 104 1/2 bushels per acre.

ORIENTAL FRUIT MOTH

(W. C. Nettles)

For the second consecutive year Elberta peaches escaped severe injury by the Oriental fruit moth (**Laspyresia molesta** Busck). This may be attributed, —**first,** to retardation of egg-laying by high temperatures at sunset during late June and early July, and **second,** to the parasitism of twig infesting larvae by the introduced parasite, **Macrocentrus ancylivora** Rohwer.

Egg-laying by the moths is increased as sunset temperatures increased from 60° to 85° F., but is greatly retarded when the sunset temperature exceeds 85° F.

Data on larval parasitism, based upon rearings from larvae collected in the College orchards, show that approximately ninety-five per cent of the parasites were **Macrocentrus ancylivora,** the species which we introduced and colonized in these orchards last year (1930). This parasite is less effective in parasitizing those larvae which have entered fruits These data are for the year 1931, whereas, the parasite was introduced in 1930 only (not again in 1931), hence we appear to have a clear demonstration that this parasite did successfully survive winter in these orchards.

A doubt was felt as to the ability of the parasite to survive our winters, not on account of temperatures, but on account of the absence of certain insects in which this parasite overwinters particularly a certain leaf-roller on strawberry. However, it was found in New Jersey that the parasite also overwintered in a certain larvae which burrows in the stems of ragweed, and during July (1931) we reared this borer from ragweed in South Carolina; thus this borer in the stem of a wild weed probably serves a highly beneficial purpose in carrying this helpful parasite through our South Carolina winters.

Colonization of **Macrocentrus ancylivora** in South Carolina was continued during 1931, and colonies were liberated in twenty orchards.

Another parasite of the Oriental fruit moth has the scientific name **Glypta rufiscutellaris** (no common name), and this was introduced from New Jersey and liberated in South Carolina orchards. As yet we have not recovered it so are not sure whether it has become established.

Biological studies of Oriental fruit moth have been continued, and it is hoped that these studies will be of value in helping to formulate control measures.

CODLING MOTH

(W. C. Nettles)

During 1931 the codling moth was more destructive and more difficult to control, than usual.

Studies of the past two seasons indicate that this destructive pest of apples normally produces three generations per season in South Carolina, with also a partial fourth generation which has not done serious damage.

The variation in life-history of this insect makes it needful to determine the life activities each year in order that sprays may be applied at the most effective times.

Codling moth tree-bands treated with chemicals to kill the larvae which take refuge beneath them are being tested in cooperation with the U. S. Bureau of Entomology. Both years practically all larvae collecting under the bands were killed, and no ill effect upon the trees has been observed. Studies are now in progress to find whether chemically treated bands repel the larvae.

It is found that on trees which have scales of rough bark and under which the ground is covered with debris many of the larvae hide in these instead of under the bands.

Laboratory tests of sprays were made to determine the effectiveness of lead arsenate alone and of lead arsenate plus calcium caseinate, and lead arsenate plus "ferro skim" as spreaders, in preventing the larvae from entering apples. The data indicate that spreaders do not greatly decrease the number of entrances, though a small number of larvae were killed in making entry into the fruit.

During 1931 the exceedingly small insect **Trichogramma minutum** Riley has been under observation as a parasite of the eggs of the coddling moth. It was noted that parasitism of the first brood eggs was only 17.4 per cent while that of the second and third was 54.7 and 67.5 respectively. If liberation of this parasite could be made when first brood eggs are most abundant, it can be seen that there would be the possibility of increasing the control of the codling moth by this parasite.

TRICHOGRAMMA MINUTUM RILEY

(O. L. Cartwright and W. C. Nettles)

Preliminary studies were undertaken during the summer to learn which strain or strains of the important egg parasite, **Trichogramma minutum** Riley, were active in South Carolina and to obtain data as to the relative fecundity of these native forms. This very small insect parasitizes eggs of the codling moth, the Oriental peach moth, the southern corn stalk borer, the corn earworm, and a large number of other injurious Lepidoptera. A strain of **Trichogramma minutum** from Ohio was imported and used in comparative tests.

The Ohio strain was placed on test May 6, using bagworm eggs as the media in which to rear the parasites. Between that date and September 22 fourteen generations were produced, ten of which have data completed. Two series of local forms were started from first and second generation codling moth eggs, the first series starting May 29 and producing ten generations, the second series starting June 29 and running through six generations. These forms were practically identical and unseparable from the Ohio strain on color characters.

However, a few parasites were reared from two southern corn stalk borer eggs which seemed darker in color and or more slender form. Unfortunately these proved to be all males. A mixed series started by mating these with females reared from codling moth eggs was begun June 15 and followed through ten generations. The dark color and slender form were lost in all progeny.

The complete data obtained would indicate but slight difference in developmental periods between the Ohio and South Carolina forms but show a noticeable difference in the fecundity of the two forms in favor of the South Carolina parasites.

The fact that South Carolina Trichogramma show greater fecundity than the foreign strain would be of considerable importance if it were undertaken to artificially multiply this helpful but minute parasite.

THRIPS ON SEEDLING COTTON

(J. G. Watts)

The injury to seedling cotton by one or more species of Thrips has been discussed in former reports, and also in a bulletin of this Station. The injury in 1931 was with few exceptions less than in 1930.

Preliminary experiments indicate that the species which infest cotton are about equally affected by any one of the several sprays and dusts used.

One of the species which occurs in destructive numbers on cotton is **Frankliniella tritici** (Fitch), and life history studies of this species were begun on April 16, and in the 150 days to September 13, nine complete generations had been reared in the laboratory, though there were 17 days without data which days are not counted in the final calculations. The average time to complete the life cycle was 14.02 days, ranging from 21.90 days in early spring to 9.20 days in mid-summer.

This same species (**F. tritici**) has been found in adult stage on cabbage during each of the winter months, but we do not yet know whether it can develop continuously through the winter.

Preliminary tests of several insecticides for the control of thrips were conducted during the spring of 1931.

At present it seems that cultural practices must play an important part in our efforts to control this insect, as several fall-planted grains harbor several species of thrips through the winter. Hence the turning under of winter cover crop at least two weeks before cotton is due to come up on adjoining land would seem to offer possibiilties in protection from thrips.

FAUNAL SURVEY

(F. Sherman)

This undertaking is designed to place on written record, in card-catalogue form, every recognized species of insect or other animal which we can ascertain to inhabit this state, with at least brief data as to the seasonal activities and as to the ascertained geographical distribution (i.e. "range") of each species within the state. As insects far outnumber all other animals, this task is chiefly an entomological undertaking.

Through a considerable period of years the entomologist has pursued this task, first in North Carolina, and now for six years in South Carolina. Always it results in the accumulation of data which throws light on problems or research and assists in our understanding of events within our field of study. in the accumulation of specimens, materials and data which are often of aid to other investigators, and of aid in our

college teaching; and is a source of information and encouragement to Station-research workers in our Division.

It was, therefore, in line with a long-time conviction and practice that Mr. Sherman, as President of the American Association of Economic Entomologists for 1930, chose as the subject of his presidential address at Cleveland, Ohio, in December (1930), the topic:- "Census Taking in Entomology," in which this idea of faunal survey work was emphasized.

In this report of a year ago it was stated that to October 28, 1930, we had recorded the presence of 2,354 species of insects in South Carolina. It is now in order to report that at the present writing (September 22, 1931) 595 species have been added to our lists since the last report, making now a total of 3,129 different species of insects known to inhabit this state.

The very fact that we have added more than five hundred to our list within a year, is a sure indication that we are yet far from a complete knowledge of our entire insect fauna.

Research in Home Economics

The Division of Home Economics endeavors to assemble, analyze, and summarize economic and sociological facts concerning the home, its conditions, operation, and possibilities. The play and recreational opportunities which the rural environment offers for young people was an aspect of farm life in South Carolina concerning which very little information was available. The months under review were devoted to a study of this important question.

The completed report appeared in June, 1931 as South Carolina Experiment Station Bulletin 275, so only a brief summary of the results will be given here.

THE PLAY AND RECREATION OF CHILDREN AND YOUTH IN SELECTED RURAL AREAS OF SOUTH CAROLINA

(Mary E. Frayser)

The investigation was undertaken in order to determine what were the social, recreational, religious, and educational opportunities (other than day school) which the rural environments under consideration offered for children and youth, and the time devoted by the young people to the opportunities offered. An effort was made to discover some of the ways in which the opportunities cited were taken advantage of by the children and young people studied and how such action was related to their well being.

The data were gathered and recorded during visits to the homes of 617 white and 337 negro young people and children, members of both owner and non-owner families in typical rural areas in four counties. Much of the data were gathered in 1927-29; but the districts under consideration were revisited in the spring of 1931 in order that the

report should register conditions existing at the time of writing. To ascertain what these conditions were 239 additional records of children and young people were taken in 1931.

The facts gathered show that the income available for equipment for the uses of leisure was usually, though not invariably, less in the non-owner than in the owner homes.

The school attendance and leisure of some of the children and youth studied were unfavorably affected by the seasonal demands of the types of farming pursued in the areas surveyed.

There were evidences of an inadequate provision for all ages in the areas studied for play, athletics, dramatics, community singing, lectures, reading, and church activities, with a consequent lack in the development of those qualities which such activities are calculated to develop.

The possibilities of club membership for young people were not fully realized by their parents and teachers, nor yet arranged for to the degree desirable by adults engaged in rural and urban social and educational work.

The Farm and Home Demonstration forces are doing much to provide recreational leadership among rural youths. The areas investigated were profiting by this procedure.

Play ground equipment was inadequate for many of the schools visited. The equipped play grounds were being used and enjoyed. This was true for both races.

Card playing was participated in by relatively few of the white youth. None of the negro youth reported card playing.

Although higher percentages of girls than of boys of both races reported hearing or playing a musical instrument, this may not be inferred to mean a greater love for music by the girls but rather to be due to more leisure and more musical training for the girls.

Radio sets were found in relatively few of the homes of the young white people studied. None of the negroes reported access to a radio.

Reading was not done to a desirable degree by the children and youth studied. Outstanding among the reasons found were the lack of access to reading material and lack of ability to read with ease by some of the youth who had left school from the lower grades. There was a very evident need for an increase of books on the shelves of school libraries. Sunday school libraries, town libraries, and for establishing traveling and special group libraries suited to the needs of children and youth.

Schools in the larger centers of the counties in which the districts were situated were attended by only two of the white youth interviewed. There were no night schools offered for negroes.

But few of the white and none of the negro subjects of this study had been camping. All who had done so were enthusiastic concerning this form of recreation.

Fishing, and swimming were relatively popular activities for both boys and girls.

The popularity of picnics with both races and all ages would apparently make the more frequent planning for this form of pleasure advisable.

The social contacts in the area under consideration were fewer and of less variety than those which normally occur in the city. This was to be expected. But they fell far below the possibilities of the environment. There were few evidences of social planning by and for the community.

There were over-churched areas, and areas with congregations too small to function efficiently. The churches in the areas studied had not made desirable progress in adjusting to changed economic and social conditions in agriculture. Notwithstanding, it was noted that in eight of the twelve groups studied higher percentages attended church than participated in any other leisure activity reported.

There were but few indications of the employment of leisure by the youth studied in ways which were actively harmful.

Little recognition was found of the principle that, without some form of higher culture comparatively few utilize leisure profitably when thrown upon their own resources. The need of active recreational leadership was apparent; potential leadership was believed to exist.

Experiments with Fruits and Vegetables

At present, research work with horticultural crops is being carried on at Clemson College and at the Sandhill Experiment Station. At Clemson College, fruit growing problems receive major attention but certain phases of vegetable production are also being investigated. Work with peaches, grapes, asparagus, sweet potatoes, and watermelons is being conducted at the Sandhill Station.

As pointed out in previous reports, the magnitude of the vegetable industry of the state and its many problems demands that greater attention be devoted to that phase of horticultural research. This has not seemed possible under prevailing conditions. However, the cooperation of Charleston County and South Carolina Agricultural Society seems likely at present to result in the purchase of a vegetable research farm and the erection of the most essential buildings. If this plan is carried out and if the legislature will provide the necessary funds for operation, it will become possible to inaugurate some long needed work along this line. Otherwise, there seems little prospect of making much progress with vegetable growing problems.

The projects of the Division of Horticulture have been pushed as rapidly as circumstances permitted during the past year. Dry weather seriously handicapped the vegetable work both at Clemson College and the Sandhill Station. Progress is necessarily slow with problems which involve a large amount of histological or chemical work. However a great deal of information of value is being accumulated which when more complete should form the basis for recommendations which should lead to more efficient production of fruits and vegetables.

APPLE POLLINATION STUDIES

(A. M. Musser and F. S. Andrews)

Work on this project has been continued along the same lines as described in the preceding report. Eight caged trees were used and the varieties studied included the Grimes Golden, which had not been previously tested. In general, the effectiveness of the different kinds of pollen on the several varieties studied was found to be the same as in other years. However, pollen of the Yates and Golden Delicious gave a higher set of Delicious than in previous tests. This may have been due to the nutritional condition of the Delicious trees which set a heavier crop this year than ever before. Delicious pollen also gave a fair set of Golden Delicious for the first time in the four years this study has been under way. This is possibly explained by the age of the Golden Delicious trees which are now eight years old and just beginning to bear normal crops. Grimes Golden proved a good pollenizer for Delicious, Ben Davis, Yates, and Winesap.

The seed content of fruits resulting from both selfed and cross-pollinated flowers of certain varieties is being studied. Also seed size and seed germination is being determined in order to correlate these factors with the size of the fruit and with male and female parent characteristics.

A study of pollen development is being made to determine the relation of pollen grain size, and other characteristic abnormalities to sterility. It has been noted, in this connection, that pollen of the Winesap does not dehisce normally. Instead the contents of the pollen sacs at the time they would ordinarily be expected to dehisce, consist of a relatively few pollen grains with clearly defined cell walls, which are held in masses together with what appears to be remains of the topetum layer or undifferentiated sporogenous tissue. When the anthers of the Winesap are dried to a degree which would liberate the pollen of other varieties, the pollen is not released. This being the case, the pollen of this variety is probably not easily disseminated under normal conditions in the orchard.

POTATO FERTILIZER EXPERIMENTS

(A. M. Musser)

The yields obtained at Clemson College this year were similar to those obtained in previous years. Fertilizer containing 5 per cent ammonia, 7 per cent phosphoric acid and 5 per cent potash, plus 100 pounds of sodium nitrate produced the most profitable yield.

The experiments at the Florence and Summerville Stations were discontinued last year and the experiment at Clemson College has now also been discontinued. A full report of the results from all three stations will be published in the near future.

The source of potash experiment at Clemson College yielded during a nine year period an average for muriate of 59.5 barrels per acre, for sulfate, 58.6 barrels per acre and for Kainit, 57.2 barrels per acre. When potash was omitted the yield dropped to 48.6 barrels per acre.

ASPARAGUS FERTILIZER AND SPACING TESTS

(R. A. McGinty, L. E. Scott and A. M. Musser)

Data are now available covering seven years fertilizer and spacing work with asparagus at Clemson College. The cooperative test conducted at Monetta was discontinued after the harvest last year.

The plots at Clemson College are located on a sandy river bottom soil of good average fertility, and yields have been better than those usually secured in the commercial asparagus area.

The yields to date show, as was reported last year, that one ton per acre of a 5-7-5 (NPK) fertilizer applied after the harvest has given the most profitable yield. Neither the use of a larger amount of this fertlizer (one and one-half tons per acre) nor supplementing the ton application with 200 pounds of nitrate of soda, applied early in the spring, gave significant increases in yield.

Application of all the fertilizer before the beginning of the harvest has resulted in consistently lower yields than after-cutting applications. Splitting the application (one-half before and one-half after the harvest period) has produced satisfactory yields. The test has demonstrated the need for using a complete fertilizer since the omission of any element has caused a reduction in yield.

In the spacing test, plants were set two feet apart in rows 3, 4, 5, 6 and 8 feet apart. The yields have been inversely proportional to row width, however, the narrower rows are now yielding spears of considerably smaller size, which together with the more difficult cultivation of these plots offsets the advantage of greater total yield.

The asparagus fertilizer plots at the Sandhill Station were harvested for the first time this spring. Forty crates per acre of asparagus, grading 40 per cent Collossal, 40 per cent Fancy and 20 per cent Choice, were cut in a 28 day cutting period. The planting made rapid, heavy growth following the harvest season and has maintained a vigorous, healthy appearance. At present these plots are all receiving the same treatment in order to determine their natural variability. After one or two more years the different fertilizer treatments will be started.

FACTORS INFLUENCING THE YIELD OF FORDHOOK BUSH LIMA BEANS

(R. A. McGinty and F. S. Andrews)

Under South Carolina conditions the Fordhook Bush Lima Bean usually fails to yield satisfactory crops although the vines may grow vigorously and flowers be borne in profusion. The object of this study is to determine the causes underlying this behavior and, if possible, devise a remedy.

In tests carried out in the greenhouse under controlled conditions, and using ordinary garden soil, increasing percentages of nitrogen in a complete fertilizer in which the percentages of phosphorus and potassium remained constant, resulted in corresponding increases in seed weight and also a progressive decrease in the height of the plants. Similar results were obtained with varying amounts of a complete fertilizer, but increasing the percentages of phosphorus and potassium did not materially affect either seed weight or plant height. While increasing amounts of nitrogen resulted in greater seed weight, the number of pods and seed was not significantly larger than that produced by the check.

In the fall of 1930, 55 individual plants of the Fordhook variety (seed obtained from the introducer) were selected and the seed saved for planting. These selections were grown the past summer. They showed rather wide variation as to plant height, spread, time of maturity, and pod and seed characters, and confirmed the opinion previously formed that this variety is rather heterogenous in character. A number of the selections will be retained for further observation.

A study of lima bean flowers indicates that the pollen grains do not dehisce from the anthers under ordinary conditions. Some of the grains germinate within the anther and likely play a part in fertilization, however, further study will be necessary to determine positively this point.

WORK WITH OKRA

(R. A. McGinty)

Work on this project deals chiefly with a strain of "spineless" okra which is being studied from several angles. This okra fell into the hands of the Horticultural Division two years ago and is of much interest because the disagreeable spines found on other varieties are practically absent from it. The original planting which seemed at first to be quite uniform was found to contain a number of different types. Pure lines are now being developed of several of these types.

A number of other varieties of okra are being grown for comparison with the spineless strains and to furnish material for studying the nature and distribution of spines and also for determining what other plant characters are correlated with their occurrence.

CABBAGE VARIETY AND STRAIN TRIALS

(R. A. McGinty)

Cabbage variety and strain trials have been under way for the last three years. These tests have been made in cooperation with the Division of Horticultural Crops and Diseases, U. S. Department of Agriculture, and the data obtained are to be included in the cabbage section of the vegetable variety type books to be issued by the Department.

As in other years, different strains of the same variety exhibited wide variation, thus indicating the need for carefully choosing a source from which to purchase seed. Certain strains of Jersey Wakefield, for example, matured evenly and the heads were solid and of much greater uniformity than other strains which were too large, too late or too uneven to be properly classed as Jersey Wakefield.

The general excellence of Copenhagen Market as an early variety was again demonstrated. The better strains of this variety are practically as early as Jersey Wakefield and are relatively quite uniform in size and other characters. Its quality for table use is superior to Jersey Wakefield and the yield was also better. Its greatest drawback is the fact that it does not seem to survive ordinary winters in South Carolina, and therefore, has to be seeded in the spring.

The strains of Charleston Wakefield grown in the test were all rather non-uniform and not very satisfactory. The dry weather which prevailed during the summer again prevented the late varieties from making satisfactory growth.

Experiments with Poultry

The projects in poultry this year have been a continuation of those previously reported and in addition the following new projects are being conducted: The use of cloth in poultry house construction, Cold storage of commercial eggs, Feeding of salt (NaCl) in poultry rations. The protection of open front house by the use of cloth, and Prevention of growth of spurs on male birds.

J. H. Mitchell and D. B. Roderick of the Agricultural Chemistry Division, cooperated in the analysis of feeds in the various experiments.

POULTRY FEEDING EXPERIMENTS

(C. L. Morgan and L. W. Smith)

Cottonseed Meal in Laying and Breeding Rations

This work was completed and is available in Experiment Station Bulletin 273. A brief summary of the work is as follows:

Cottonseed meal (high protein content) was a satisfactory substitute for meat scraps in the laying mash when supplemented with a mineral mixture supplying phosphorus, calcium carbonate, and sodium chloride.

Cottonseed meal did not effect the fertility of the eggs, but reduced hatchability. Where cottonseed meal replaced all of the meat scraps in the mash, hatchability was very unsatisfactory. Replacing one-half of the meat scraps with cottonseed meal reduced hatchability only slightly.

Feeding cottonseed meal to the breeding stock did not affect the size of chicks hatched, their subsequent growth, or the maturity of the pullets when fed a standard ration.

Neither egg size nor quality of the fresh egg was affected by feeding cottonseed meal.

Weight and health of the hens were not affected by feeding cottonseed meal.

The use of cottonseed meal in laying mashes should be determined by its price as compared with meat scraps and by whether or not the eggs are intended for hatching purposes.

Ground Barley vs. Ground Yellow Corn in the Mash for Layers and Breeders

This work has also been reported in Experiment Station Bulletin 273 so that only a brief summary will be given here:

Ground barley was a satisfactory substitute for ground yellow corn in a standard laying mash when the scratch grain was composed of a large per cent of shelled yellow corn and green feed was available for the birds.

Ground barley as compared with ground yellow corn under the conditions of the experiment did not affect the fertility or hatchability of the eggs produced.

The use of barley to replace yellow corn in poultry rations should be determined by the relative prices of the two grains and the availability of vitamin A.

Skimmilk vs. Meat Scraps as Supplements to Cottonseed Meal

This work has been completed during the past year and is available in Experiment Station Bulletin 273. A brief summary of the work is as follows:

Skimmilk and meat scraps are equal in feeding value as supplements for cottonseed meal in laying rations.

Skimmilk was slightly less valuable than meat scraps as a supplement for cottonseed meal in the mash for breeding hens. Both fertility and hatchability were slightly less where milk was used.

At the prevailing feed costs the skimmilk ration made slightly less return over feed than the meat scrap ration. Where skimmily is available on the farm its use should prove economical.

USE OF CLOTH IN POULTRY HOUSE CONSTRUCTION

(L. W. Smith and C. L. Morgan)

A cloth poultry house was constructed at the poultry plant in November 1930 for study and practical observations. This is an open front shed type house twelve by fourteen feet. The frame of this house was constructed of two by two pine lumber, with the exception of the base sills which were made of two by fours. The frame material was covered with pajama cloth. The cloth was then painted with three coats of gas tar and lime mixed. The cost of the material for constructing a twelve by fourteen cloth house is $13.27.

The walls of this house are standing the weather elements in good shape. The roof remained water proof for about three months after the last coat was applied. From this time on the roof has given trouble. More work will be required before we will be able to recommend it for the use of commercial poultrymen. This house has possibilities in the South providing we find a way of improving the roof.

PREVENTION OF GROWTH OF SPURS ON MALE BIRDS

(L. W. Smith)

Male birds do considerable damage to each other by fighting which could be prevented if the spurs were not present.

At the experiment station this year 64 males were treated by the potassium hydroxide method and very few have developed spurs. This treatment consists of removing the spur cap with a knife when the birds are 8 to 12 weeks old. After caps are removed and the blood starts to flow apply a small amount of potassium hydroxide by rubbing into the wound.

Clemson Coast Experiment Station

(E. D. Kyzer, Superintendent)

Continuing our livestock studies and related feed and forage projects, largely begun in 1930 when cotton was dropped from our cropping system, all lands in cultivation have been devoted to feed and forage crops either grown in experimental work with the crops or as feed for animals used in livestock studies. Below is given a brief report of the projects under way and the results of same where data are available at this time.

FORAGE CROPS FOR FATTENING HOGS

(E. D. Kyzer and T. M. Clyburn)

During the winter of 1930-1931 four lots of ten hogs each were grazed on acre lots of the following crops:- rape, barley, Austrian field peas, and a grain mixture of equal parts of oats, rye, and barley, all lots being full fed on corn, fish meal, and minerals in addition to the forage. As a check on the forage lots, one lot of hogs was full fed on corn, fish meal and minerals in dry lot. The number of days required by each lot to reach an average final weight of 200 pounds from an average initial weight of fifty-eight pounds was as follows:- barley eighty days, rape eighty-two days, dry lot eighty-five days, grain mixture of oats. rye and barley eighty-six days, and Austrian field peas ninety-two days. With corn valued at 8.4c and fish meal at $70.00 per ton, the cost of 100 pounds gain was $5.86 in the barley lot, rape lot $5.97, grain mixture lot $6.07 and dry lot $6.13, while the Austrian field peas cost per 100 pounds gain was $6.29. All of the forages were readily grazed by the hogs with the exception of the Austrian field peas which were refused entirely.

WINTERING TEST OF BEEF CATTLE

(E. D. Kyzer and T. M. Clyburn)

This work was planned in the fall of 1930 to compare a ration of sorghum silage, oat straw, and cottonseed meal with one of corn stover, oat straw, and cottonseed meal in the wintering of mature beef cows. Ten pure-bred Angus cows were used in each lot and were fed the following average daily ration per one thousand pounds of liveweight:-

Lot 1		Lot 2	
Sorghum silage	36.4 pounds	Corn stover	12.35 pounds
Oat straw	5.0 pounds	Oat straw	5.0 pounds
Cottonseed meal	1.93 pounds	Cottonseed meal	2.89 pounds

While the results as to the total gains in each lot were not comparable, due to the fact that a greater number of cows calved in lot 2 than lot 1, the data from individual cows indicates that dry cows carrying calves may be successfully wintered on rations containing largely dry roughages instead of silage. Using the following prices for feeds used:- silage $6.00 per ton, oat straw $8.00 per ton, corn stover $8.00 per ton, and cottonseed meal $30.00 per ton, the cost of wintering a cow for the 112 day period was $13.82 in Lot 1 and $11.63 in Lot 2.

A STUDY OF THE EFFECT OF A MINERAL MIXTURE ON THE GROWTH AND BREEDING QUALITIES OF BEEF CATTLE

(T. M. Clyburn and E. D. Kyzer)

This study as well as many of the other livestock projects is in cooperation with the United States Bureau of Animal Industry and is planned to cover a period of at least five years. Twenty pure-bred Angus heifers sired by one bull were divided into two comparable lots. Feeds for the wintering period and the pasture season are identical in both lots with the exception of mineral supplements. Both lots receive block salt at all times while lot 1 receives in addition to the salt a mineral supplement in the form of high calcium and phosphorus materials. One day weights are taken at twenty-eight day intervals as well as three day weights at six month intervals. In addition to the weight records, a complete record of all feeds and pasture acreage will be kept for the entire test. As the heifers come to breeding age, all will be bred to one bull and as in the case of the dams, a complete feed and weight record will be tabulated for the calves. All heifer calves are to be retained in the experiment for the period of the test while the bull calves will be disposed of at the age of six months. At the close of the experiment, some interesting as well as instructive data should be available for beef producers of the coastal areas of the southeastern states.

METHODS OF PREPARING CUT OVER COASTAL LANDS FOR SEEDING to PASTURE GRASSES

This test, initiated in 1930, was planned to secure information as to what preparation, if any, other than burning, is necessary before seeding carpet grass and lespedeza on the cut-over coastal lands of South Carolina. In this work, three plots of one acre each were used, all lots having a complete sod of broom sedge and other native grasses of little feed value as well as some few low bush oaks and gall berry bushes. All three lots were burned in January. Lot 1 received no further perparation, Lot 2 was double disced with tractor harrow and then harrowed with smoothing harrow, and Lot 3 was broken broadcast with a 2-horse turn or mold board plow, disced with a tractor harrow, and afterwards harrowed with smoothing harrow to leave the land as level as possible. After allowing rains to firm the soil in the prepared lots, all lots were seeded to ten pounds of carpet grass and five pounds of common lespedeza on March 26th. On July 16th, stand counts of the carpet grass were made on small given areas and at five given points in each plot. These counts showed the following stands per 62.5 square feet:- Lot 1 (burned) 140 plants; Lot 2 (disced) 337 plants; Lot 3 (plowed, disced and harrowed) 958 plants. From the 1930 results of this test, it is evident that in the second and succeeding years the advantage of the prepared lots over the unprepared ones is intensified due to two conditions:- first, probably a six to one better stand to begin with, and second, the absence of the competition of the native grasses and bushes which are largely killed in the process of preparation as is the case of Lot 3, this test.

ADAPTATION STUDIES OF PASTURE GRASSES

In this work the following grasses were used both in garden plots as well as in general pasture:- carpet grass, centipede, Dallis, bahia, and Reeds canary grass. In the garden plots as well as pasture lands, all grasses seem to be adapted to this section and soil with the exception of Reeds canary grass. This grass failed to live throughout the summer in both garden and pasture lands. Of the other grasses, carpet and Dallis seem to be more adapted to all conditions of this section of the state than any of the other used though centipede and bahia both thrive on the lighter and better drained soils.

FERTILIZER STUDIES WITH OLD AND NEW CARPET GRASS AND LESPEDEZA SOD

The fertilizer work on old carpet grass sod, consisting of fifteen one-tenth acre plots, one-half of each being limed, has been continued. Clippings for yield determinations as well as for complete chemical analysis have been made throughout the growing season. Results of this work have not as yet been completed, however, indications are that

the split applications of readily available nitrogen in conjunction with single applications of phosphorus and potash are producing the greatest total growth as well as lengthening the grazing season.

In addition to the above fertilizer work with pastures, the effect of phosphorus on first year seedings of carpet grass and lespedeza is being studied. This observation was begun in 1930 and continued on new seedings in 1931. In the case of both seasons, very marked results were obtained by the use of 200 pounds of 16 per cent superphosphate broadcast on top of the soil shortly after seeding. This increase in growth held true for the carpet grass as well as the lespedeza.

CROTALARIA VARIETIES AND SESBANIA

The **crotalaria** varieties-spectabilis, striata, retusa, and grantiana were planted in three foot rows without any fertilizer on May 8th. Two shallow cultivations were given them as they seemed to be needed to kill the grass and weeds. On September 16th, the following yields of green matter in tons per acre above the ground were noted:-
Spectabilis, 10.06; Retusa, 3.28; Striata, 16.56; Grantiana, 10.44. These yields are considerably more than double those of 1930 which were obtained from a broadcast planting.

Sesbania: This soil building plant, which is reputed to produce large tonnages of green manure per acre and which matures in a much shorter period than most of the crotalaria varieties was not planted until July 22nd and on September 16, when in full bloom, yielded 4.55 tons of green matter above the ground.

CORN VARIETY TEST

With the increasing use of yellow corn in many of the poultry and livestock rations, this test was enlarged from the eleven varieties used in the 1930 work to sixteen this season in order to include several of the more promising yellow varieties. Results of this test have not as yet been obtained, however, indications are that the yields will be good with possibly little change in the standing of the leading white corns. Since the 1930 results were not available for that report, they are given below.

Variety	Yield in Bu. per A.
Marret's Douthit	55.6
Latham's Double	54.7
Douthit's Prolific	52.2
Hasting's Prolific	49.3
Weekley's Prolific	48.8
Pee Dee No. 5	47.0
Whatley's Prolific	42.4
Marett's Lowman Yellow	41.2
Humco Marlboro Prolific	40.9
Goodman's Prolific	39.5
Humco Fulcrop	37.8

FORESTRY STUDIES

The original forestry work was begun here in 1912 and this tract now includes natural reproductions of loblolly and long leaf pines as they thrive under complete protection from fire and livestock; slash pine plantings in seed spots, broadcast, and transplantings, all of which have done well; and a study of the growth and stand of natural reproductions of long leaf when burned annually. On the additional forestry tract of 100 acres, plantings of both slash and loblolly seedlings have been made, this being done in March of this year. As a check against these plantings, areas are devoted to natural reproductions with both treated and untreated seed beds. This work is in cooperation with the United States Forest Service through their southeastern headquarters at Ashville, North Carolina.

In addition to the forestry studies with the various species of pine, small plantings of Asiatic chestnut seedlings were made this spring. This variety of chestnut is reputed to be resistant to the ravages of blight which have caused considerable damage to the chestnut forests of many states.

As a protection to other marginal lands of the Station, which are rapidly growing up in pines, a fire line is maintained on all sides of the Station tract. Since these lines have been completed they have been 100 per cent effective against the annual fires which occur on all adjoining lands.

The Pee Dee Experiment Station

(E. E. Hall. Superintendent)

Duirng the year 1930-31 the work at the Pee Dee Station has continued along the lines described in previous reports but with several impotrant changes and additions. The tobacco work was placed in charge of Mr. R. E. Currin, for a number of years superintendent of this station. A statement regarding this work appears elsewhere in this report. Considerable emphasis has been placed upon soil building, feed, and food crops. The important cotton research initiated at this station continues to yield valuable returns.

COTTON RESEARCH WORK

(E. E. Hall and S. J. Watson)

Seed Treatment

Yield records obtained in our spacing work clearly show the importance of obtaining and maintaining a good stand of cotton. For several years we have treated seed in various ways before planting to hasten germination and to control diseases, some of which resulted in an increase in stand and yield of seed cotton. Machine delinted and acid delinted seed have given more uniform stands and in less time than normal seed. Several dusts are now on the market for treating

seed, and we are using a number of these with a view of determining their value. We have obtained some outstanding resutls with some of these when the treated seed were planted on land that had grown cotton for several years and dusted heavily with calcium arsenate. We are using nine different dusts in our tests this year. Machine delinted seed dusted with Ceresan gave an increase in stand of 19.4 per cent, while with acid delinted seed there was an increase of 37.0 per cent. Other dusts with varying strengths resulted in differences in stand ranging from a decrease of 6.2 per cent to an increase of 21.2 per cent. Yield records for the various treatments are not available at this time.

Time of Planting

The time of planting tests have been continued over a period of years, with the view of determining approximate planting date that will give the greatest yield. Plantings are made every seven days, beginning about March 15 and continuing to May 10. Frequently poor stands are obtained from planting too early, resulting in low yields. With the exception of 1925 and 1930 March plantings have not yielded as much as those made from April 1 to 15, while those made later than April 15 have resulted in a reduced yield.

Spacing

Extensive spacing tests with cotton since 1923 show conclusively the importance of obtaining good stands and having a large number of plants per acre for maximum yields. Spacings with one plant per hill six and nine and twelve inches, have given about the same average yield and the largest amount of seed cotton at first picking. Spacings closer or wider than above mentioned have given smaller yields and less cotton at first picking. Our spacing work was discontinued this year with the exception of spacing under sweet poison conditions only. Where only sweet poison has been used early, one plant every six inches has given the highest yield at first picking, and also greatest total yield. These results clearly emphasize the fact that it is very essential to have a large number of plants per acre to obtain maximum yields where no protection from the weevil is given later in the season.

Broadcast Seeding of Cotton

Our first effort in growing cotton broadcast was in 1930 and from results obtained we felt there was some promise for this method of growing from economical production standpoint. The planting was made on land of medium fertility, which was reasonably free of grass and weeds.

The fertilizer area produced 1550 pounds of seed cotton per acre as compared to 1166 pounds for the unfertilized.

Our planting this year was made on land in high state of cultivation on which weeds and grass had seeded last year. After cultivating several times with a weeder it became necessary later to remove grass and weeds with hoes. The cotton averages from 3 to 5 feet in height with but very little fruit, a large per cent of which has rotted.

Judging from our two years results it appears that broadcasting may give satisfactory results on land that is poor to medium in fertility and which is reasonably free of grass and weeds.

Cotton Following Winter Cover Crops

We are continuing to seed definite areas each fall to winter legume cover crops which are turned early in March and the land planted to cotton. Certain areas are left without a cover crop, but otherwise receive same treatment as those with cover crops. All plots receive the same basic fertilizer but during the growing season the cotton on half of each plot receives 200 pounds of nitrate of soda, while the other half is left without soda. In 1930 cotton following cover crops without soda outyielded the check plot cotton with 200 pounds of soda.

The cover crop growth this spring was not as good as in 1930. Hairy vetch yielded the largest amount of dry matter, 2416 pounds containing 56.5 pounds of nitrogen, as compared to 1863 pounds of dry matter for Monantha vetch with 53.1 pounds of nitrogen. Hungarian vetch and Austrian Winter Peas had about the same amount of nitrogen, being about half that contained in Hairy vetch and Monantha vetch. From results so far obtained it is evident that a good crop of cotton can be produced following a winter cover crop with but little or no side dresser.

FERTILIZER AND ROTATION EXPERIMENTS

(E. E. Hall and S. J. Watson)

Our fertilizer and rotation studies consist of 180 tenth acre plots arranged in four series, three of which are in a three year rotation of corn, small grain, and cotton, the fourth series being in cotton continuously. Originally peas were planted in the corn and let remain on the land, but for the past five or six years we have not been able to grow peas successfully, consequently a winter cover crop of vetch or Austrian peas is grown preceding the cotton crop to compensate for the pea crop.

Excellent yields of all crops are being made on the rotation series, the highest yield in 1930 being 2360 pounds of cotton per acre, and 46 bushels of corn. The series in Continuous Cotton for 17 years has become very unproductive and low yields are obtained.

SWEET POTATOES

(J. H. Beattie and J. D. McCown)

We are continuing our sweet potato work in cooperation with the Bureau of Plant Industry. The main lines of work under investigation include fertilizer test, spacing, variety test and time of bedding and setting.

Fertilizer Tests

Fertilizer containing 3, 6, 9, 12 and 15 per cent of potash is applied at the rate of 500 pounds per acre on four sets of plats. Results last year, as in previous years, indicate that there is a response in yield from the increasing proportions of potash up to 9 per cent.

Time of Planting

This work has for its purpose the finding of the effects of planting sweet potatoes at different dates, beginning as early in spring as possible and continuing until there would no longer be time for the crop to reach a worthwhile stage of development. Plantings were made last year on following dates: May 15, May 30, June 30, and July 15. There was a marked decrease in the proportion of large or Jumbo size sweet potatoes as the date of planting advanced. There was a similar increase in the proportion of small or No. 2 size sweet potatoes and a total reduction in yield as the planting date advanced.

Spacing

In our spacing tests plants are set at intervals of 6-9-12 and 15 inches in four foot rows. Results over a period of years show that the closer spacings yield a larger percent of No. 1 potatoes. In 1930 there was an increase in the proportion of Jumbo size and a decrease in the proportion of small sized sweet potatoes as the spacing increased from 6 inches, but no marked difference in the yield of No. 1 potatoes.

Varieties

Our sweet potato variety test this year includes 25 varieties. The Porto Rico and Nancy Hall are our two most popular potatoes. A number of new strains were introduced last year, some of which are very promising from yield and quality standpoint.

CORN

(E. E. Hall and J. D. McCown)

Varieties

The demand for good seed corn of high yielding varieties is increasing yearly, and we are frequently called upon for information regarding corn varieties. In order to be able to supply this information, we obtain seed of the most promising varieties for our conditions direct from breeders every year and plant them in variety test. Eighteen varieties are included in our test this year, most of which give promise of making excellent yields. For the ten year period 1921 to 1930, Douthit's Prolific made the highest average yield, 55.1 bushels per acre, Pee Dee No. 5 made the second highe styield, 54.1 bushels per acre, and Coker's Garrick third with 52.2 bushels.

Width of Row

For several years we have planted corn in rows varying in width from 3 1/2 to 6 feet in order to determine best width for maximum yields. The highest yield last year, 55.7 bushels, was produced in four foot rows. Yields for this year are not yet available, but indications are that our best yields will be made on 3 1/2 or 4 foot rows.

SOYBEANS

(E. E. Hall and J. D. McCown)

As the hog industry increases in the state, more interest is being taken in soybeans. We are growing thirteen varieties (planted April 17, 1931) from which we hope to obtain data that will be of value in economical pork production. Some of these have produced excellent growth. Green and dry weight determinations have been made on each variety at different stages of growth. On July 2 dry weight yields ranged from 2,000 to 3,550 pounds per acre.

CROTALARIA

(E. E. Hall and S. J. Watson)

Several strains of Crotalaria have been used very successfully as soil building crops in Florida, and some strains now give promise of becoming valuable grazing crops for cattle. We have eleven strains planted at the Pee Dee Station this year, (1931) some of which have made tremendous growth.

Green weight determinations were made of several strains on September 1. The largest of these, Crotalaria Spectabilis, yielded 63888.0 pounds of green matter per acre, while a yield of 46464.0 pounds was produced by Crotalaria Palysperma. Two other strains produced over thirty thousand pounds of green matter per acre. Dry weight determinations are being made, after which they will be analyzed for nitrogen in order to determine amount of nitrogen per acre that will be added to the soil when turned under.

WEEVIL ACTIVITY IN COTTON FIELDS

(F. F. Bondy)

During the summer of 1931 the United States Bureau of Entomology, cooperating with the Pee Dee Experiment Station, made weekly boll weevil infestation counts in cotton fields in various counties over the State. The information thus obtained was released weekly in the newspapers in such a way as to appraise the farmers of what they might expect on their respective farms. In this way farmers were enabled to plan their boll weevil control operations before the infestation got too far advanced.

The first release on May 30 reported a large number of adult weevils feeding in the terminal buds of the young cotton plants. This infestation, under normal rainfall during the last of June and first of July, was

sufficient to do serious damage. In many fields the weevils caused serious damage, although this was a relatively dry summer.

The counties visited on these survey tours and the number of farms surveyed for boll weevil infestation are as follows:

Darlington County	13 farms
Florence County	10 farms
Calhoun County	6 farms
Orangeburg County	7 farms
Bamberg County	3 farms
Aiken County	4 farms
Greenwood County	4 farms
Union County	8 farms
Chester County	5 farms

There was a total of 90 fields examined each week.

Some poisoning was done but it was not as general as in 1930, due to the low price of cotton and the poor financial condition of the farmers.

The farmers and county agents, as a whole, realize the benefit of these reports and look forward to their issue.

In order to determine the weevil movement in the cotton fields screen traps were located on various farms around Florence. Eight were located in cotton fields and three in open pea fields some distance from cotton.

General weevil movement in the cotton fields began the first week in August and on August 13 four weevils were caught on two of the three pea field screens. This date was about the time of general weevil migration as a large number of weevils were caught every day throughout the remainder of August.

The Sandhill Experiment Sation

(J. A. Riley, Superintendent)

At the Sandhill station, near Columbia, the United States Department of Agriculture and the South Carolina Experiment Station are working cooperatively on a number of problems looking to the improvement of the agriculture in this important section of the Southeastern States. The forces engaged in research work at this station at the present time represent the Bureaus of Dairy Industry, Plant Industry and Chemistry and Soils of the United States Department of Agriculture and the divisions of Agronomy, Dairy, and Horticulture of the South Carolina Experiment Station.

The construction of laboartories; offices; residences for the staff; work stock, dairy, and calf barns; implement sheds; and other necessary buildings has now reached a point where no further structures are contemplated at this time.

Since January 1931 a pneumatic water system has been installed which utilizes the six inch well drilled some month ago. A cast iron pipe line conveys water to the dairy plant several hundred feet away.

Other buildings are being supplied, tho inadequately, by the old system. When funds are available for the extension of water lines, the one plant will serve all needs.

At present permanent fences are being constructed for grazing lots and exercising paddocks which are adjacent to the barns.

Visitors: Each year groups of farmers are attracted by the experiments which are being conducted and are led to visit the station to examine more carefully experiments with the crops being grown and the development of the dairy unit. The milking machinery, the barn, and the dairy animals come in for considerable attention from dairymen in this state as well as from other states. County Agricultural Agents and Vocational Agricultural Teachers quite often make use of the Station in the manner indicated. Home Demonstration Agents use the facilities offered for Farm Women Council meetings and other club activities.

Crops: Though the seasons have been somewhat dry sufficient rain fell to produce crops satisfactory for the measurement of the results of different treatments which had been given in the several experiments. Satisfactory yields of forage; ensilage, and grain crops are being had on lands used for production of these crops to be fed to livestock. No cotton is produced on the station other than that produced as a by-product of experimental work in connection with this crop.

Reforestation: One of the most likely uses to which the land of the Sandhill section may be profitably employed being the growing of forest trees a small beginning has been made in getting started the different species of pine which give promise in the area. A part of the land formerly in scrub oak has been cleared and planted using four different methods of seeding and four species of pine.

HORTICULTURAL EXPERIMENTS

(L. E. Scott)

Peaches

The twenty acre Elberta orchard used in fertilizer and cultural tests has made satisfactory growth this season despite a severe attack of bacteriosis early in the summer. The trees are not yet of bearing age so no yield records were obtained.

Of the various fertilizer treatments the plot without nitrogen is the only one that shows decided differences in growth and vigor. These trees are making much weaker growth and the foliage is of very poor color.

One half of the orchard was given a 1400 pounds per acre application of high magnesium lime this spring. Growth of a summer cover crop of cowpeas on the limed area was approximately 100 per cent heavier than on the unlimed area.

The trees in the planting made this spring comprising varieties of peaches, plums, pecans and figs are making good growth.

Asparagus

The planting made in 1929 to be used in fertilizer tests was harvested for the first time this spring. Forty crates per acre of asparagus, grading 40 per cent Collossal, 40 per cent Fancy and 20 per cent Choice, were cut in a 28 day cutting period. The planting made rapid, heavy growth following the harvest season and has maintained a vigorous, healthy appearance.

The 1930 planting that is to be used for providing material for chemical studies on food reserves, in the asparagus crown, was not harvested this year. This planting developed a severe attack of rust early in the season that seriously affected growth. During the late summer the infection has decreased and the planting is recovering from the effects of the disease.

Grapes

The two year old vines of phylloxera resistant species to be used as stocks for American and European varieties have made very rank growth this year. The variety planting made this spring shows satisfactory gorwth. Bench grafts of American and European varieties on rooted and unrooted cuttings of resistant stocks were made and planted in the nursery last winter.

Berries

A planting of Young berries in 1930 produced at the rate of 1 1/2 quarts of berries per vine this year. The vine makes a vigorous growth and is proving to be resistant to anthracnose.

Of the raspberry varieties planted this spring, the Latham and Van Fleet are making the most vigorous growth. The New Logan, Cuthbert and Ontario are weak-growing.

Watermelons

A fertilizer test indicated that manure applied at the rate of 3 tons per acre and placed in the hill produced heavier yield than 800 pounds application of 8-4-4 (PNK) fertilizer. Doubling the percentage of PNK separately and together did not result in increased yield. Heavy application of commercial fertilizer in the hill before planting delayed and in some cases prevented germination and checked the early growth of the plants.

Cantaloupes

Hale's Best, Bender's Surprise, Kilgore's Hummer and Abbott's Pearl proved to be the best four of thirteen varieties of cantaloupes this year.

Sweet Potatoes

The sixteen varieties of sweet potatoes in the variety test planting and the rate of potash test plats are growing nicely but are showing the effects of the lack of rain during August.

SOIL FERTILITY INVESTIGATIONS

(J. E. Adams)

The Effect of Various Green Manure Crops on the Chemical Composition of Soils

Various legumes were grown during the summer of 1928 on 97 plots. These plats have been cropped to corn beginning in 1929 and continued to date.

Samples of soil were taken from these plats before the experiment was started, and have been taken semiannually during 1929, 1930, and 1931. These samples have been analyzed, with the exception of those of September of this year, for carbon and nitrogen. This work serves as an index of the durability of green manure crops and cover crops under a continuous summer cropping with corn.

The general trend is toward the depletion of the soil organic matter, not only of that added by means of the green manures and cover crops but also of that present at the beginning of the experiment. There is undoubtedly a rapid conversion of organic nitrogen to the available form which means a rapid loss of plant food during seasons of heavy rainfall. This was much in evidence during the summer of 1929, the crops actually lacking available nitrogen before the growing season was past.

Fertilizer Ratio Experiment with Soybeans

Under conditions existing on light sandy soils such as are common to the Sandhill region it is apparent that a complete fertilizer is necessary for the production of soybeans. When each plant-food element is considered alone nitrogen produced the best growth, phosphorus next, and then potash. A potash deficiency is apparent on those plats receiving no potash.

FORAGE AND SOIL IMPROVEMENT CROPS

(R. B. Carr)

Soil improvement is the outstanding problem in the Sandhill section. Before these coarse poor soils can be made to produce cash crops economically and food and feed crops efficiently they must be enriched by addition of large quantities of organic matter and by application of mineral nutrients. The work at this station includes numerous experiments with many different kinds of soil improvement crops. Reference is made below to some of the more important of these.

Green Manuring

This experiment was undertaken for the purpose of studying the possibilities of soil improvement by turning under green manure crops. In this case cowpeas, soybeans, velvet beans, and crotalaria are being used as summer legumes and corn and sorghum as indicator crops. Crimson clover, hairy vetch, and Abruzzi rye are used as winter crops. These plantings and treatments are arranged in such manner as to yield infor-

mation on the following points: the effect of turning under legumes as compared with non-legumes, the residual value of different leguminous green manure crops, the relative value of turning an entire crop as compared to turning only the stubble, the benefits of summer grown manure crops as compared with both summer and winter crops. Results are being measured by chemical analysis and by crop responses.

Winter Legumes

Since the fall of 1928 experimental plantings have been made of from 15 to 18 of the legumes most commonly grown in the Southern States. In addition to these more or less common legumes about 100 selections from these and from other varieties of legumes have been planted in rod rows. Many of the new introductions were of course failures but information is being secured from observation and yield data secured from the others which indicate their place in forage production and in soil improvement. Fertilizer tests are also being conducted with some of the more promising of these winter legumes.

Crotalaria

Crotalaria is one of the most important legumes recently introduced into this country. So far we have no common name for this group of legumes. There are about six thousand species wild and cultivated growing in different parts of the world. Five species are described as native of the United States. The large majority of the species however are native to the tropical and sub-tropical regions. The chief value of this plant at the present time is as a green manure crop. Crotalaria striata, the species which has attained widest commercial importance in the United States, was first introduced from Eastern Africa in 1909 and planted at the Florida Experiment Station. Many other species have since been introduced and are now under test at the Florida Station and at other stations in the South. In 1928 sixteen species of Crotalaria were planted at the Sandhill Station. Since that time these have been continued and others added until there are now about forty on trial. So far Crotalaria striata has proven the most popular of all the strains and species studied. It is an upright plant reaching four to six feet in height branching freely in thin stands and makes heavy yields of green manure. The seed begins maturing in late August and continues until frost. One of the nearest competitors from the standpoint of yield is Crotalaria spectabilis. This species is later maturing and so was not considered very important until an earlier strain was produced at this station. Some of the species of Crotalaria are being tested as forage plants. The more productive of these have not proven palatable and some have proven injurious when fed to cattle. Palatability and nutrition tests are being made of a large nubmer of species at the present time.

Pigeon Pea

Pigeon pea is another comparative new legume that is very promising in the Sandhill section. This was first planted at this station in 1928. The tests have been conducted on a small scale. The seasons are too short for the ordinary varieties but some selection work has shown that it is possible to produce strains which seed abundantly and early enough to insure a crop of seed every season. Some rather limited trails indicate that the Pigeon pea may be used as a summer grazing crop. It has more value however as a soil builder.

Soybeans

In 1928 fifteen varieties and approximately 100 selections of soybeans were sown in duplicate in one-tenth and one-hundredth acre plats. These have been continued from year to year and the more promising strains have been tested on a larger scale, data being secured for both seed and hay yields. These limited tests indicate that the Biloxi and the Mammoth Yellow are probably the heaviest yielders of seeds under these conditions although other varieties like Herman, George Washington, and Virginia mature earlier. The Laredo and some selections from it are the most outstanding as hay bearers. Some selections from other varieties are also promising in this respect.

Cowpeas

Variety tests and selections of cowpeas have been continued since 1928. The test now includes the more common varieties grown in the Sandhill region. The Brabham, Whippoorwill and Virginia Black-eye are proving best as hay and seed varieties.

Velvet Beans

Velvet beans are also being grown for forage and as a green manure crop. Selections have been made during the past three years of both the bush type and the running beans. Some of the strains developed at this station are very promising.

Grass Nursery

In 1928 a grass nursery was planted with a view of studying the various native grasses and to introduce new varieties which might become adapted to the climatic and soil conditions of the Sandhill area. One hundred and twenty eight grasses were set that year and in 1929 about fifty others were added. Some of these were complete failures and have since been discontinued in the test and others added to replace them.

The grasses are first set in rod rows and the promising ones then tried further in larger plats. Those which possess qualities desired in a pasture grass are tried in the experimental pasture, an area of about four acres which is under fence in order that grazing may be

controlled. Those which seem promising as a lawn grass will be set on the station lawn. This experimental pasture is now partially set with new grasses and legumes.

Kudzu

In 1928 some kudzu was planted in a small area in the grass nursery. The growth was rather satisfactory at that time but because of the excessive growth of weeds and grass, which held the nodes off of the ground preventing their rooting, the growth in subsequent years had to begin at the mother crown. A new area has been laid out and clean cultivaton has permitted very encouraging growth. The young runners are now beginning to root at the node indicating that at the age of two years the field will be a solid mat of luxuriant vines.

Sorghum Varieties

The sorghum variety test, including 15 varieties of both the grain and the saccarine types, was begun in 1928, and has since been continued as started. None of the varieties have been outstanding in their production of green weight but one or two of the grain sorghums have made very good yields of seed. Early seedings of all varieties have given the most satisfactory results.

DAIRYING

(E. W. Faires)

Permanent Pasture Development

Before the establishment of a dairy unit was undertaken it was deemed desirable to conduct experiments in forage and feed production and in pasture development. This project, the development of a permanent pasture, was started in 1928.

The 97 acres selected for the project lie principally along the headwaters of small streams and adjoining hillsides. The soil types are largely Hoffman Sandy Loam in the lowland and Norfolk Sand in the upland. The area was uncultivated being covered with virgin growth of blackjack oaks with scatterings of pines. Clearing of this land was done during the winter of 1927-28, and in April 1928 the land was prepared and seeded. An 8-4-4 (PNK) fertilizer was applied at the rate of 450 pounds per acre. On the lowland and water seepage areas 23 pounds of Common lespedeza, 8 pounds of Carpet grass and 3 pounds of White (Dutch) clover were used, while on the upland 12 pounds of Common lespedeza and 8 pounds of Bermuda grass, per acre, was the mixture used. A time after the general seeding 12 pounds of Dallis grass and a small amount of Reed's Canary grass were scattered on the lowland area. The Reed's Canary grass ap-

parently did not germinate. The development during the 1928 growing season was not considered satisfactory and it was decided, early in 1929, to reseed and refertilize the area. The fertilizer mixture was the same but the rate per acre was increased to 500 pounds per acre. The grass mixtures were increased to 40 pounds on the lowland and 30 pounds on the upland.

The season of 1929 was considered ideal for pasture grass development, growth was early and moisture was sufficient for early and continued growth. Germination of the reseeding was considered good and growth for the entire season very satisfactory. The pasture was cut over twice during the season for weed eradication.

There was no reseeding nor additional fertilizer added to the pasture in 1930. Seasonal conditions for growth were fair and sufficient grazing was supplied for eleven heifers and about 75 goats.

The growth of the pasture early in the spring of 1931 was very slow, but with rains in late July and early August the pasture has made remarkable growth and is affording sufficient pasturage for all livestock placed on it.

During the summer there has been an experiment in progress for measuring the carrying capacity of the pasture under present conditions. Cultivated lots outside the pasture, where summer, fall, and winter grazing crops may be grown are being used to supplement the permanent pasture in the hope of developing a continuous grazing system.

Development of the Dairy Plant

The development of the Dairy Plant was started in June, 1929. The plant now consists of the following buildings: a main housing barn 28 x 128 feet accommodating 29 box stalls and grain storage rooms, with hay mow space on the second floor; a milking parlor consisting of eight milking stalls; a milk room and rooms for dairy equipment, a heifer barn 34 x 50 feet, accommodating 22 heifers; a calf barn 34 x 50 feet, accommodating 20 calves; two bull sheds, accommodating two bulls each; and two concrete silos with capacity of 86 tons each. The plant will accomodate a herd of around 75 head of cattle.

Establishment of the Herd

The production of milk and butterfat by individual dairy cows is an inherited factor. Having this in mind and with the hope of developing a strain of cattle which will be pure in their inheritance for high production and which may be counted on to transmit this quality uniformly to succeeding generations, only cattle of very high standards for both type and production have been selected for use in the dairy herd.

In June 1929 ten Guernsey heifers and one proved-for-production bull were purchased to form the foundation for the dairy herd. Again in June, 1931, eleven additional heifers were purchased, thus bringing

the number of foundation females to twenty-one. From these foundation heifers the herd has been increased, through births, by seven females and five males.

Official Testing

All heifers, as they have calved, are placed on official test to determine their milk and butterfat producing abilities. The tests are conducted under as near uniform conditions as circumstances will permit. During the year four heifers have completed records at an average age of two years, three months, and five days. These records average 9807.4 pounds of milk, testing 5.05 per cent equivalent to 495.27 pounds of butterfat. At the present there are seven two-year olds on official test.

Proving Bulls

When the bulls, resulting in the breeding operations for developing a strain of cattle pure in their inheritance for high production, are of breeding age, they are to be placed on loan with farmer breeders who are willing to do testing work. Two such bulls have been placed with cooperators.

Preliminary Feeding Trial with Citron or Stock Melons

Because of numerous inquiries as to the possibilities of citron or stock melon for a dairy ration, a feeding trial was planned to determine the palatability of the melons and compare them with soaked beet pulp in the dairy cow's ration. Stock melons are very low in total digestible nutrients, only 4.8 pounds of nutrients being supplied in 100 pounds. Compared with soaked beet pulp it takes 3.7 pounds of melons to equal one pound of beet pulp.

Apparently stock melons are palatable as the consumption per cow per day would indicate. One cow consumed an average of 108 pounds daily for ten days, while another consumed an average of 100 pounds for a like period. Neither cow seemed to tire of the ration. Compared with soaked beet pulp the production over a ten-day period was not as great with melons as with beet pulp.

The Clemson College Farms

The Clemson College lands at Clemson College consist of 1,620 acres. About 300 acres are in pasture, 600 in cultivation, several hundred acres in forests and rough lands not suited to cultivation, and the remainder comprises the Clemson College campus. Of the 600 acres in cultivation 200 acres are used for numerous small field plat experiments the results from which are reported elsewhere by the other divisions in charge. The remaining 400 acres of cultivated land are used for producing feeds for the experimental herds of dairy cattle,

beef cattle, hogs, and sheep, and, where the land is suitable, for experiments with crops on a larger scale. The principal crops grown by the Farms Division are corn, small grain, hay, and cotton. On most of these crops some form of research work is being conducted, certain phases of which are briefly discussed in the following paragraphs.

SOIL IMPROVEMENT STUDIES

C. S. Patrick

This is a continuation of the work with soil improvement which has been in progress for the past ten years. During this time a winter cover crop of rye and vetch has increased the productive capacity of our land approximately 100 per cent.

For six years studies have been made to determine the value of a cover crop of rye and vetch as compared with fresh manure from the dairy barn in the production of cotton.

Plot number 1 received commercial fertilizer; plot number 2 commercial fertilizer and eight tons of fresh manure per acre, plot number 3 commercial fertilizer and a cover crop of vetch and rye turned under about two weeks before planting; and plot number 4 received commercial fertilizer, eight tons of fresh manure, and a cover crop of rye and vetch. Results indicate that a good crop of rye and vetch when properly turned under is as valuable as an application of eight tons of fresh manure per acre in the production of cotton.

A STUDY OF THE POSSIBILITIES OF A SOYBEAN-SMALL GRAIN ROTATION BY THE USE OF MECHANICAL POWER

(C. S. Patrick)

The purpose of these rotation studies is to determine whether or not soybeans and small grain may be produced as a profitable diversion from the one crop cotton system prevalent in the South and at the same time improve the fertility of the soil. In these studies the seed are harvested with a combine which in the same operation scatters or places in a windrow the soybean hay or the small grain straw so that it may be turned under to improve the soil or taken up for feed. So far in this work practically everything has been turned back into the soil except the seed.

On account of dry weather in 1930 the soybean crop did not mature seed. The small grain in 1931 produced a good crop which lodged badly as a result of a storm just before harvest; however by the use of the combine practically 100 per cent of the grain was harvested. As a result of lodging it was necessary that the combine be drawn very slowly, but in spite of this fact, the small grain crop was harvested with a combine at less cost per acre than with the binder and the separator where there was no lodging.

Although the rainfall has been very light, the straw from the small grain did not delay the germination of summer legume seed planted and this crop has made an excellent growth during exceedingly dry weather. The soil improvement phase of this work of course cannot be determined in one year.

Publications

The demands for the publications of the South Carolina Experiment Station are constantly increasing, showing a higher appreciation of the value of scientific research in relation to practical agriculture. This increased demand is especially noticeable for publications on agricultural economics, home economics, livestock, soil-building and truck crops. The increased number of publications from some of the lines of research work are meeting this increased demand in part. There seems now special need for further information regarding truck crops. In many instances supplies of older publications have been exhausted and there is need for larger editions of publications on the more popular subjects.

New publications as issued are distributed through a classified mailing list, which has been revised during the year, and which now contains perhaps 5,000 names classified according to the important subject matter divisions. A large percentage of the names on the list consists of South Carolina farmers.

PUBLICATIONS ISSUED

During the fiscal year 17 new publications were issued as follows:

Bulletin 267, "Analysis of Commercial Fertilizers".
Bulletin 268, "The Diet of School Children in Relation to Their Health".
Bulletin 269, "Pee Dee Farm Management Studies 1925—1930".
Bulletin 270, "Cotton Marketing Studies 1925—1930".
Bulletin 271, "Frankliniella Fusca Hinds (Thrips) on Seedling Cotton".
Bulletin 272, "Care and Management of the Dairy Bull".
Bulletin 273, "Poultry Feeding Experiments".
Bulletin 274, "Rations for Fattening Hogs on Soybean Forage".
Bulletin 275, "The Play and Recreation of Childen and Youth in Selected Rural Areas of South Carolina".
Circular 41, "Slash Pine for Reforestation in the Coastal Plain".
Circular 42, "Winter Cover Crop Experiments at the Pee Dee Experiment Station".
Circular 43, "Protecting South Carolina from Crop Pests and Plant Diseases".
Circular 44, "The South Carolina Agricultural Experiment Station—A Brief History, 1887—1930".
Circular 45, "Newer Truck Crop Area Studies".
Circular 46, "Piedmont Farm Management for 1931".

Circular 47, "The Grade and Staple of South Carolina's 1930 Cotton Crop".

"Forty-third Annual Report for the year ended June 30, 1930".

TECHNICAL CONTRIBUTIONS (new series)

No. 1. The Onion Thrips on Seedling Cotton, With a Season's Record of Parthenogenetic Development, By C. O. Eddy, W. H. Clarke. Journal of Economic Entomology, August, 1930.

No. 2. A study of The Cotton Plant with Especial Reference to Its Nitrogen Content, by G. M. Armstrong and W. B. Albert. Journal of Agricultural Research, May 1931.

No. 3. The Effect of Cod Liver Oil on the Quality of Egg Shells, by C. L. Morgan, J. H. Mitchell and Donald B. Roderick. Poultry Science Proceedings of the Twenty-Second Annual Meeting. 1930.

No. 4. Calcium Arsenate and Unproductiveness in Certain Soil, by W. B. Albert and W. R. Paden. Science, Vol. 73, No. 1901, June 5, 1931.

No. 5. Some Effects of High Soil Moisture and Lack of Soil Aeration upon the Fruiting Behavior of Young Cotton Plants, by W. B. Albert and G. M. Armstrong. Accepted for publication in Plant Physiology. 1931.

No. 6. Cotton Physiology, by C. A. Ludwig. Accepted for publication in Journal of Agricultural Research. 1931.

No. 7. Census Taking in Entomology, by Franklin Sherman. Journal of Economic Entomology, February 1931.

No. 8. Lima Bean Studies, by R. A. McGinty. Proceedings Association of Southern Agricultural Workers, Atlanta, Ga., February 1931.

N. 9. The Relation of Growth of Tops to Size of Crowns in Asparagus, officinalis, by W. C. Barnes. Proceedings Association of Southern Agricultural Workers, Atlanta, Ga., February 1931.

No. 10. The Value of Legumes in Maintaining Soil Fertility in South Carolina, by W. B. Rogers. Proceedings Agronomy Section, Association of Southern Agricultural Workers, Atlanta, Ga., February 1931.

No. 11. Relation of the Electromotive series and Ionization Potentials to Soil Chemistry and Plant Nutrition, by H. P. Cooper. Proceedings Association of Southern Agricultural Workers, Atlanta, Ga., February, 1931.

No. 12. Raising Dairy Calves with a minimum Amount of Milk, by E. C. Elting, Proceedings Dairy Section, Association Southern Agricultural Workers, Atlanta, Ga., February 1931.

No. 13. Unproductiveness in Certain Soils and the Use of Calcium Arsenate, by W. B. Albert. Proceedings Association of Southern Agricultural Workers, Atlanta, Ga., February 1931.

No. 14. Rations for Hogs Grazing Soybeans, by E. G. Godbey. Proceedings Association of Southern Agricultural Workers, Atlanta, Ga., February 1931.

No. 15. Cottonseed Meal for Laying and Breeding Stock, by C. L. Morgan. Proceedings Association of Southern Agricultural Workers, Atlanta, Ga., February 1931.

PUBLICITY WORK

In order to keep the work of the Experiment Station and the publications which it issues prominently before the public, news letters and special articles have been issued through the Publications Division for the use of newspapers and agricultural journals. These news letters and articles call attention to new publications and to various activities of the Experiment Station and its staff. Articles by various members of the Station staff have also been prepared and given publicity through the Division of Publications, and otherwise. The material in these news letters and articles is, of course, based largely on the results of our research work during the fiscal year or before. In this way the public is given wider and better knowledge of the work which the Station does, and this in turn enables the Station to be of greater service to the public.

Library

It invariably follows that when professors return from study at other institutions, more reference work is demanded from their students. This year has been no exception. We have also borrowed more material for the research workers from other libraries, notably that of the Department of Agriculture. As usual, technical journals have been sent to members of the agricultural faculty as soon as they have been checked, hence they see the latest developments in their respective fields and can look them over at their leisure.

The completion of the files of bulletins, magazines, and United States Department of Agriculture publications still goes on. We have had two large shipments which should make the collection more valuable, namely: publications from the Agricultural Research Institute of India consisting of bulletins and scientific reports, Botanical Survey Records and bulletins in the technological series of the Indian Central Cotton Committee, and an algae, mycology, and general collection of over fourteen hundred books and pamphlets from Dr. Thomas Johnson of Ripon, England. Other purchases have been the Catalog of the Lindley Library of the Royal Horticultural Society, London, Bailey's Hortus, and volumes of the Rothamsted Memoirs on Agricultural Science through 1930.

Some of the items in Dr. Johnson's collection are:

Bailey, F. Manson.—Comprehension Catalogue of Queensland Plants.

Dillwyn, Lewis Weston.—British Confervae. London, 1809.

Evelyn, John.—Silva: or, A Discourse of Forest-trees. York, 1776.

Hoffman, Carl.—Botanischer Bilder-atlas nach De Candolle's Naturlichem Pflanzensystem.—Stuttgart, 1884.

Thuret, M. Gustave.—Etudes Phycologiques: analysis d' Alques Marines. Paris, 1878.

Vancher, Jean-Pierre.—Historie des Conferves D'eau Douce. Geneve, 1803.

The filing of the subject cards of experiment stations was completed during the summer. The bound periodicals are gradually being catalogued. Approximately, one hundred and eighty volumes have been rebound.

Projects Under Way

AGRICULTURAL ECONOMICS DIVISION

Farm Land Price Study of the State
Farm Credit Study of the State
Farm Organization and Management in the Upper Piedmont Area
Farm Organization and Management in the Pee Dee Area
Farm Organization and Management in the Orangeburg Area
Farm Organization and Management in the Newer Truck Areas
Comparison of Mechanical and Horse Power
Cotton Marketing Study of the State
A Study of the Methods and Price Factors in Marketing South Carolina Hogs

AGRONOMY DIVISION

Cotton Variety Test
Corn Variety Test
Oat Variety Test
Wheat Variety Test
Rye Variety Test
Barley Variety Test
Soybean Variety Test
Barley Breeding (Selection)
Pasture Seeding Experiment
Species and Variety Adaptation Test of Clovers, Vetches and Other Winter Legumes
Introduction Test of New Plants and Crops
Time of Seeding Austrian Winter Field Peas
Winter Hardiness of Oats
Seed Treatment of Cotton
Time of Planting Cotton
Source of Nitrogeneous Fertilizer to Cotton
Rate of Application of Nitrogenous Fertilizer to Cotton
Source of Top-dresser Fertilizer to Oats
Rate of Application of Nitrogenous Fertilizer to Oats
Time of Application of Nitrogenous Fertilizer to Oats
Rate of Application of Nitrogenous Fertilizer to Corn
Time of Application of Nitrogenous Fertilizer to Corn
Organic vs. Inorganic Sources of Nitrogen to Cotton
Comparison of Sources of Sodium Nitrate as Side-dresser to Cotton
Fertilizer Analysis, Rate of Application, and Liming Test with Cotton in a Three-year Rotation

Fertilizer Analysis Application to Oats
Fertilizer Analysis Application to Wheat
Rotation Study with Cotton and Corn
Time of Planting Oats
Fertilizer Analysis Application and Rotation Tests with Tobacco
Source and Rate of Potassic Fertilizers to Tobacco
Source of nitrogenous Fertilizers to Tobacco
Organic vs. Inorganic Nitrogenous Fertilizers to Tobacco
General Fertilizer Analysis Test with Cotton, Corn and Small Grain in Rotation (Keitt Plots)
A Study of the effect of Fertilizer Placement in the Production of Cotton
Cotton Fruiting Studies
A Study of the Oil Content of Cotton Seed
Sources, Rate and Time of Application of Potassic Fertilizers to Cotton, Corn and Small Grains
Potash Side-dressing Experiments to Cotton
Effect of Various Winter Legume Crops When Turned Under for Soil Improvement (Cotton and Corn Rotation)
Investigations of the Effect of Various Sources of Nitrogen on the Chemical and Biological Changes in the Soil and the Influence of These Materials and Changes on the Composition and Yield of Crops
Investigation of Arsenic Injury to Various Crops When Too Heavily Applied to the Soil

ANIMAL HUSBANDRY DIVISION

Protein Supplements to Corn for Fattening Hogs in Dry Lot
Hand versus Free Choice Feeding of Corn and Fish Meal
A Study of the Results of Intensively Inbreeding Berkshire Swine
Green Soybean Forage for Flushing Ewes
A Study of the Inffuence of Soybeans When Fed with Limited and Full Rations of Corn and Corn and Tankage on the Hardness of Fat in Hogs
A Study of the Influence of Soybeans When Fed with Limited and Full Rations of Corn and Corn and Fishmeal on the Hardness of Fat in Hogs
Cottonseed Meal for Mules
Cottonseed Meal in the Ration for Wintering Pregnant Ewes

BOTANY AND BACTERIOLOGY DIVISION

A Sfudy of the Factors which Influence the Growth and Development of Cotton Buds and Bolls
An Abnormal Condition of Oats and Cowpeas Caused by Insufficient Manganese in the Soil
The Concentration of Soluble Arsenic as an Index of Arsenic Toxicity to Plants

Germination of Cotton Seed and Growth of the Seedlings at Low Temperatures
The Effect of Environmental Factors upon the Amount of Injury in Cotton Seedlings by the nema, A parietinus
The Internal Infection of Cotton Seed
A Study of the Length and Structure of Cotton Fibers
Plant Disease Survey

CHEMISTRY DIVISION

Study of the Relationships between the Content of Certain Mineral Elements of Farm Grown Roughages and the Mineral Content of the Soil
Study of the Factors Influencing the Iodine Content of Plants
Study of the Influence of Fertilizers on the Protein Content of Plants

DAIRY DIVISION

Preparation and Economic Uses of Roughages in Feeding Dairy Cattle
Line Breeding and Out Crossing as Systems of Breeding Dairy Cattle
Official Testing of Dary Cows in the State
Study of the Influence of Different Feeds on the Growth of Dairy Heifers
Raising Dairy Calves with the Minimum Amount of Milk
Effect of Fertilizers on Pasture
Rate of Assimilation of Calcium and Phosphorus by Dairy Cows
Study of the Relation Between the External Form and the Internal Anatomy of the Dairy Cow and Her Producing Ability
Use of Cotton Seed in the Dairy Ration
Cost and Efficiency of Electrical Refrigeration for Dairy Farms

ENTOMOLOGY DIVISION

Life-History and Control of Southern Corn Stalk Borer
Studies of Corn Weevil and Associated Insects
Biology and Control of Corn Bill Bugs
Hibernation Studies of Cotton Boll Weevil
Biology and Control of Mexican Bean Beetle
Control of Tomato Fruit Worm
Potato Spraying
Life History, Natural Enemies, and Control of Oriental Fruit Moth
Biology and Control of Codling Moth
Biology and Control of Cotton Flea Hopper
Studies of Thrips on Seedling Cotton and Other Plants
Faunal Survey

HOME ECONOMICS DIVISION

The Play and Recreational Activities of Children and Young People in Rural South Carolina

HORTICULTURE DIVISION

Apple Pollination Studies
Peach Fertilizer Tests
Asparagus Fertilizer Trials
Composition of Asparagus Crowns
Potato Fertilizer and Seed Source Tests
Lima Bean Studies
Fruit and Vegetable Variety Trials
Variability of Peach Seedlings
Sweet Potato Variety, Fertilizer, and Spacing Tests

POULTRY DIVISION

Cost of Egg Production
Cost of Raising Pullets
Cottonseed Meal in Laying and Breeding Rations
Skimmilk vs. Meat Scraps as Supplement to Cottonesed Meal
Ground Barley vs. Ground Yellow Corn in the Mash for Layers and Breeders
Value of Cod Liver Oil in Laying Rations
Comparison of Meat Scraps and Fish Meal for Laying Hens
Virus Vaccination as a Control for Chicken Pox
Use of Cloth in Poultry House Construction
Preventing Growth of Spurs on Male Birds
Cold Storage of Commercial Eggs in South Carolina
Feeding of Salt (NaCl) in Poultry Rations
Protection of Open Front House by Cloth Frames

FARMS

Soil Improvement Studies
A Study of the Possibiilties of a Soybean-Small Grain Rotation by the Use of Mechanical Power
The Power Unit as a Factor in Producing Cotton
The Power Unit as a Factor in Producing Corn
Machine Application Fertilizer Studies at Clemson College
Studies With Lespedeza for Hay.

Clemson College, S. C.
October 15. 1931.

Dr. E. W. Sikes, President
Clemson Agricultural College
Clemson College, South Carolina

Dear Sir:

The foregoing is the Forty-fourth Annual Report of the South Carolina Experiment Station for the fiscal year which ended June 30, 1931.

Respectfully submitted,

H. W. Barre, Director.